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GOT WIRELESS?

THE M WORD
Although still in their infancy, mobile-commerce applications are expected to generate big business in coming years. Page 54

A MATTER OF TIME
Don Tapscott predicts that nearly everyone will embrace wireless technology before too long. Page 32

WALL ST. WATCH
Online brokerage execs such as Nasos Topakas are putting stock in wireless trading. Page 24

COMPUTERWORLD

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MARKETPLACES ARE TOUGH TO BUILD

Finding skilled staff can be frustrating

BY CAROL SLIWA AND JULIA KING

Picking the right technology to build a complex e-marketplace is only one step in the process. Snaring a skilled consulting team sometimes can be a more frustrating and challenging endeavor.

BENTZINGER looks all over for staffers

Even well-established consultancies can be hard-pressed to supply each client with a team of seasoned experts. Users said they have some-

Staffers, page 85

Immature technology one cause of problems

BY JULIA KING AND CAROL SLIWA

Eventually, e-marketplaces are supposed to be faster, cheaper and more efficient than existing supply chains. But first, they must be built.

Many early movers are finding that's a far more complicated, time-consuming and resource-intensive process than they had originally figured. Immature technology, inexperienced implementation teams and unrealistic expectations are among the reasons.

"Nothing is coming out of the box," said Monica Morse, managing director of Min-

Technology, page 85

MBA STUDENTS DITCH DOT-COMS

Return to school as start-ups lose luster

BY JULEKHA DASH

A year ago, MBA students from such prestigious schools as the University of Pennsylvania, Northwestern and Carnegie Mellon left the classroom to join what they thought were promising start-ups. But a lot can change in a year.

This fall, many of those same students have re-enrolled. At the University of Pennsylvania's Wharton School of Business in Philadelphia, six of the roughly 25 MBA students who left last fall are now taking courses full time, while at Northwestern University's Kellogg School of Management in Evanston, Ill., four out of eight students have returned.

The fact that "a lot of [dot-com] companies aren't going to make it is a bigger reality now than a year ago," said Macarthur McBurney, one of Kellogg's returning students.

McBurney left Kellogg last fall to become a marketing manager at Cincinnati-based Synchrony Communications Inc., a customer relationship management software provider. But he said he always in-

MBA Students, page 16

AMDAHL GIVES UP ON MAINFRAME BUSINESS

New focus on high-end Unix servers will leave field to IBM, analysts say

BY JAIKUMAR VIJAYAN

Amdahl Corp. last week confirmed that it plans to exit the mainframe market, a move that shocked some users and led analysts to warn that IBM will have more freedom to avoid reducing prices on its big-iron S/390 systems, now that its two plug-compatible rivals are largely exiting the scene.

Seven months after Hitachi Data Systems Corp. in Santa Clara, Calif., said it was scaling back its mainframe efforts, Amdahl announced that it's doing the same thing because the investment required to stay competitive with IBM's new 64-bit mainframes isn't worth the projected return.

Amdahl, page 16

JUST THE FACTS

Market View

A snapshot of the mainframe market:

Major vendors: IBM, Amdahl, Hitachi

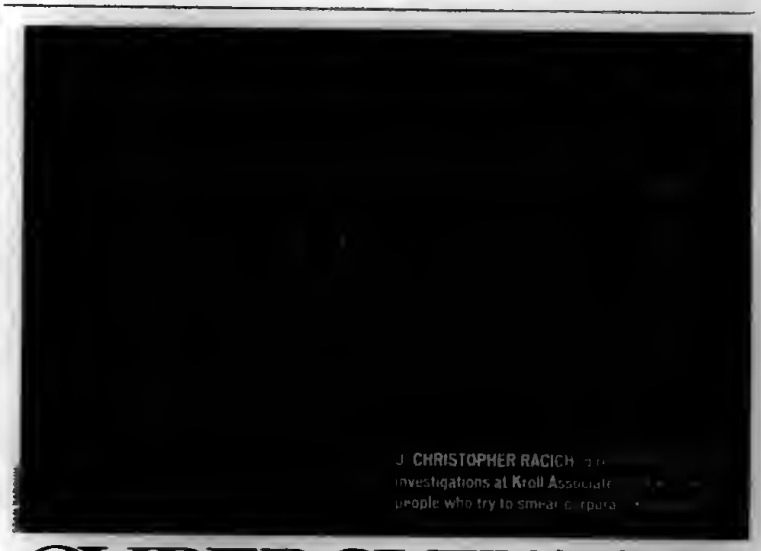
1999 market share by vendor: IBM 79%, Hitachi 12%, Amdahl 9%

2000 projected market share: IBM 86%, Amdahl 10%, Hitachi 4%

Total mainframe MIPS installed last year: 1.12 million

Estimated MIPS installed this year: 1.4 million

SOURCE: META GROUP INC., STAMFORD, CONN.



J. CHRISTOPHER RACICH
investigations at Kroll Associate
people who try to smear corpora

CYBERSLEUTHS

Corporate brands, trademarks, stock prices and executive reputations can take a real beating on Internet message boards. But now companies are fighting back, Mitch Betts reports, with help from Internet monitoring and investigation firms. These firms use Web crawlers, artificial intelligence and even psycholinguists to figure out who's saying nasty things about clients on the Internet.

Story is on page 20.

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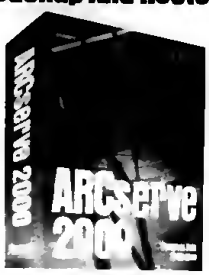

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MAKING THE MIGRATION

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AT DEADLINE

Sabre to Offer Wireless Check-In

Within the next six months, Sabre Holdings Corp. plans to roll out a wireless check-in and boarding system that it says will allow air travelers to avoid lines and navigate their way to planes with nothing more than a Web-enabled phone or a personal digital assistant. Fort Worth, Texas-based Sabre last week announced that it's teaming with Carrollton, Texas-based wireless vendor Impulsity Inc. to develop the new system, which will use voice biometrics and screen shots of bar codes to identify airline passengers and then send images of boarding passes to their mobile devices.

FTC to Hold Hearings On Sale Practices

The Federal Trade Commission will hold hearings Oct. 26 and 27 that will take aim at the software industry's practice of selling software through a license rather than a sale. The FTC will also look at the use of shrink-wrap or click-wrap warranties to limit liability. The FTC isn't considering any specific rules for the industry, but the hearings could lead to later action, an official said.

Short Takes

GALILEO INTERNATIONAL INC., the Rosemont, Ill.-based operator of one of the travel industry's big computerized reservation systems, last week announced plans to shop itself to potential buyers. The company's decision puts one of the largest mainframe computing systems in the world up for sale. . . . Palo Alto, Calif.-based WAL-MART.COM INC.'s ongoing Web site renovations are taking longer than anticipated. The site, which closed Oct. 3, was set to reopen Oct. 17 but probably won't go back online until Nov. 1, said a company spokeswoman.

Correction

The photo on page 16 of our Oct. 16 issue should have been that of Kmart Corp. CEO Chuck Conaway. The photo we used was one of PeopleSoft Inc. CEO Craig Conway.

MindSpring Site Exposes Password Files

E-commerce application opens floodgates

BY ANN HARRISON

An unpatched, buggy version of open-source e-commerce software, combined with a misconfigured hosting server, exposed password files earlier this month for approximately 100 domains hosted by Atlanta-based EarthLink Inc.

The chain of events included the discovery of a 2-year-old security flaw and the exposure of password lists for all customers on two MindSpring Enterprises Inc. servers. The situation illustrates some of the potential perils of failing to register e-commerce software with vendors that issue security and other upgrade advisories.

A Web search by an affected customer has uncovered potentially thousands of e-commerce sites that haven't applied the patch.

The problem started two years ago, when Web Store software created by Singapore-based Extropia.com was upgraded to fix a security flaw and users were sent an advisory with a patch.

Three years earlier, A Dog Owner's Network had a custom implementation of the open-source software installed. But the Lake Arrowhead, Calif.-based e-commerce site never registered with Extropia to receive the patch.

A student reportedly discovered that the dog owner's site (*www.adognet.com*) was vulnerable and told Atlanta-based MindSpring on Oct. 10. That led to the discovery that a misconfiguration on the site's MindSpring hosting service, owned by EarthLink, allowed attackers to view the password lists of other sites hosted on the same servers.

Cris Alarcon, an information technology administrator at aDogNet.com, said his staff created their own patch for the 7-year-old software as soon as they learned of the bug. Alarcon said he later conducted a Web search for other companies that used Web Store and turned up 2,500 users, half of whom appear not to have downloaded the patch.

"It's natural to open source that you are going to get a broad distribution of the program, but there are many unregistered versions that are not privy to updates," said Alarcon. "Since many of these companies have smaller sites, they are less likely to have a technical department that keeps up on data security issues."

Alarcon said that his company doesn't keep any sensitive customer data or credit-card numbers on the hosted server, and that only low-level passwords were exposed.

According to Alarcon, the most disturbing part of the incident was that any hosted site on MindSpring would theoretically read about the vulnerability, download the flawed software and get passwords from other sites.

Dave Flammia, director of Web-hosting support at EarthLink, acknowledged that other sites hosted on the same servers as aDogNet.com did have their password files exposed. "They could cut and paste it from the Web," he said.

But Flammia said he had no knowledge of MindSpring being alerted to the problem prior to Oct. 17. He added that that MindSpring changed its server configurations on the evening of Oct. 18 to make sure that password files weren't exposed.

Flammia said the vulnerability affected Sun Solaris servers that hosted only "a handful" of customers — perhaps fewer than 100. He said MindSpring had contacted affected customers and asked them to change passwords.

"We asked them to change them to something harder to crack, so that a simple dictionary program couldn't crack it," Flammia said.

Patching Web Store

www.gunther.web66.com/FAQS/taintmode.html

- Extropia.com set up a list of frequently asked questions at the above Web address to explain the Web Store patch and upgrade.
- Extropia says the best practices in the FAQ were applied to all its scripts
- Site includes default enablement of Perl's Taint-Mode security watchdog

MORE THIS ISSUE
For more news on security, see pages 12 and 18.

Software Upgrade Glitch Grounds Los Angeles Airport

Radar software upgrade blamed

BY LEE COPELAND

Rob Enderle, a San Jose-based analyst at Giga Information Group Inc., had planned to travel to Los Angeles last Thursday morning to attend a conference. But his flight, slated to depart from San Jose at 8 a.m., was grounded on the tarmac due to a software-upgrade glitch.

Enderle and his fellow passengers didn't know it, but the Federal Aviation Administration (FAA) had called a halt on all flights scheduled to land at or depart from Los Angeles International Airport for four hours that morning.

Technicians loading an upgrade to radar software at the Los Angeles air-traffic control center caused a mainframe host computer to crash at 6:58 a.m., said Jerry Snyder, a spokesman at the FAA. The system was partially restored at 8:15 a.m. and fully restored by 1:05 p.m., he said.

According to the FAA, the radar software processes incoming digital flight data, such as a plane's altitude and speed, and translates that critical data into alphanumeric blips on the radar screen. Without those blips, it's difficult to track flight traffic.

"It was a pretty darn pesky problem," Snyder said. By law, the FAA must stop or reduce air traffic if the proper radar systems aren't running, he added.

The Los Angeles air-traffic control center in Palmdale, Calif., is one of 20 such facilities that the FAA operates across the country for handling flights operating at 17,000 feet and higher. The agency uses multimillion-dollar hardware systems from IBM in each facility, FAA officials said.

After shutting down the main radar system last Thursday, a backup system automatically took over. But Snyder said the alternate system doesn't automatically route flight data to the air traffic controllers, which meant the data had to be hand-carried to the appropriate controllers.

Snyder insisted that safety wasn't compromised in the incident.

Under normal conditions, air-traffic controllers at the airport can guide the landings and departures of approximately 84 flights per hour. During the perind when the system was partially restored, FAA officials said, the controllers could handle only 64 flights per hour.

To restore the air traffic radar, technicians removed the software upgrade and returned to the previous version.

The FAA canceled hundreds of flights into and out of Los Angeles airport, the nation's fourth-largest airport. The cancellations caused backups and delays throughout the U.S.

Gail Gadei, a spokeswoman at the Department of Airports in Los Angeles, was unable to say at press time how many flights had been affected by the radar equipment failure.

Enderle never made it to the conference. After more than three hours on the grounded plane, he opted to return home. "It was a noontime speaking engagement, so there was no point in going," he said. "It goes to show that the more complex a software system gets, the more likely there are to be problems down the line."

IBM products weren't responsible for the glitch, said an IBM spokesman.

IT Implications Linger for Chevron/Texaco Merger

Analysts predict eventual consolidation of electronic-business operations

BY JULIA KING

LAST WEEK'S announced merger of oil giants Chevron Corp. and Texaco Inc. will create the world's fourth-largest energy company.

It also will mean the integration of several electronic-business initiatives now under way at both companies, which together will boast annual revenue of more than $80 billion.

The combined ChevronTexaco Corp., to be headquartered in San Francisco, expects to cut costs by $1.2 billion per year by combining operations, officials said. Plans also include the elimination of approximately 4,000 jobs, or 7% of workers across the two companies, where rumors of a merger have been swirling since May.

How hard information technology will be hit by the planned job reductions — if at all — remains unknown. Neither company could be reached for comment. But analysts said there will likely be some consolidation of the two firms' administrative and oil production and distribution operations.

"Both companies are similar in their structure in that they're both big, integrated oil companies. There's a lot of overlap, and they will eliminate that duplication of effort," said Brian Eisenbarth, an oil industry analyst at Collins & Co. in Larkspur, Calif.

A Common Challenge

Several other industry giants have been wrestling with similar issues after recent mergers that formed the world's three largest oil companies: Exxon Mobil Corp. in Irving, Texas (see related story, below); BP Amoco PLC in London; and Royal Dutch/Shell Group in The Hague, The Netherlands.

One analyst said it might not be the end of the merger activity. As a combined entity, Texaco still doesn't top $100 billion, so the company may acquire another firm to compete with the other merged giants.

On the IT front, Chevron and Texaco officials said one of the key benefits of the merger will be a broader portfolio in advanced technologies, including e-commerce ventures.

Texaco is working with consultants from New York-based PricewaterhouseCoopers to implement buy-side procurement software from Ariba Inc., a project it expects will be completed by the end of the year and that will cut current procurement costs substantially, said Greg Vesey, Texaco's vice president of e-business.

San Francisco-based Chevroo is also using software from Mountain View, Calif.-based Ariba to develop PetroCosm Corp., an independent, online business-to-business marketplace for oil and gas companies that it created with White Plains, N.Y.-based Texaco.

Now, however, analysts said the Chevron/Texaco merger could raise questions among other industry players about Houston-based PetroCosm's status as an independent, neutral marketplace.

"On the plus side, the merger means both companies can place more focus on the exchange. But on the downside, it's no longer a consortium," said Randall Nottingham, an energy analyst at The Yankee Group in Boston. "I can see that PetroCosm may want to find other industry backers so they're not seen as a one-player exchange."

Other Ventures

Chevron's other key online marketplace venture is Concord, Calif.-based RetailersMarketExchange.com, an online exchange for convenience-store retailers and their suppliers that was spun off from Chevron earlier this month.

Earlier this year, Texaco created an internal $20 million venture fund to finance e-commerce initiatives put forth by its various business units.

Texaco has also implemented an extensive intranet application, known as PeopleNet, which functions as a huge, worldwide knowledge base for its far-flung workers.

A New Look

Effects of Chevron/Texaco merger announced last week:

CHEVRON
HQ: San Francisco
Employees: 31,000
1999 revenue: $35.4 billion
IT operations: Outsourced 400 IT jobs to Electronic Data Systems Corp. in 1997

TEXACO
HQ: White Plains, N.Y.
Employees: 26,000
1999 revenue: $35.7 billion
IT operations: 450 workers in Houston

CHEVRONTEXACO
HQ: San Francisco
Employees: Will cut 4,000 jobs
Est. 1999 revenue: $80 billion

Exxon Mobil Adopts mySAP.com as Its 'Primary Backbone'

Merged oil giant looks to standardize its ERP systems using controversial platform

BY MARC L. SONGINI

Nearly a year after its merger, the massive Exxon Mobil Corp. has inked a deal to consolidate its global information technology backbone on the controversial mySAP.com platform.

Such a move by the world's largest oil company, as well as other giants such as Nestle SA in Vevey, Switzerland, may make mySAP.com — SAP AG's Web-enabled enterprise resource planning (ERP) software — more attractive to firms still sitting on the fence.

What Is It?

Since it was announced more than a year ago, mySAP.com has been loaded with issues for some users. One obstacle has been defining what it is. Is it an e-business platform, collaboration tool or interface to legacy applications — or all three?

But both Exxon and Mobil have been SAP customers since the 1980s. The merged company, created when Exxon bought Mobil, decided last month to make mySAP.com the "primary backbone" of its technology infrastructure. The company said it's making good on its existing SAP investment and will be able to ensure the migration is as painless as possible, said Exxon Mobil spokeswoman Suzanne McCarron.

Other recently merged petrochemical companies may do likewise, said David Boulanger, a director at AMR Research Inc. in Boston.

"If you go back to the other contenders, they all have competitive pressures and they all have SAP, and they are all looking at mySAP.com," he said.

While many details remain sketchy, Irving, Texas-based Exxon Mobil claims that all 107,000 of its employees will "have some level of interface" with SAP applications.

"By consolidating and upgrading our systems, we will streamline our business processes, lower information system support costs and provide access to common consistent data — all of which will result in overall cost savings, rapid information technology project implementations and improved performance," McCarron said.

A Two-Year Project?

Exxon Mobil wouldn't disclose the cost or duration of the project, but analysts estimate it could take as long as two years.

The firm will use mySAP.com's supply-chain management, human resources, plant maintenance, accounting and finance and oil and gas applications.

The oil and gas software will enable functions such as dispatch planning and optimization, and provide volume calculations for product density and temperature. It will also handle inventory management and permit an interface with terminal automation systems, said McCarron.

Exxon Mobil also plans to use mySAP.com's Workplace product to provide a single human resources application throughout the company, with several self-service functions built into it, said McCarron.

This may not be as widespread an implementation as it sounds on the surface, said David Dobrin, an analyst at Cambridge, Mass.-based consultancy Surgency Inc.

Exxon already had a large number of SAP applications installed, as well as some from other vendors, giving it a hodgepodge of legacy systems.

Some parts of the merged company will run on mySAP.com, but not all, according to Dobrin.

ERP Is a Gas

ExxonMobil merged in November 1999. Now the company says it aims to standardize its global IT infrastructure on mySAP.com. ExxonMobil will use mySAP.com to handle:

- Oil and gas processing
- Human resources operations
- Finance and accounting
- Service station retailing
- Supply-chain operations for chemicals unit
- Plant maintenance

Delivery Firms Pump $230M Into Wireless

FedEx, UPS, Airborne spend past year hustling for edge in real-time technologies

BY BOB BREWIN AND LINDA ROSENCRANCE

FEDEX GROUND'S announcement last week that it plans to deploy an $80 million wireless information system is the latest in a series of major investments by the nation's leading package-delivery firms tu leverage wireless technology and provide customers with real-time tracking and delivery information.

The fiercely competitive FedEx, United Parcel Service of America Inc. and Airborne Freight Corp. all view their ability to deliver real-time, in-transit and delivery information as a competitive advantage in the New Economy, where delivery personnel are the front-line troops. That helps explain why the Big Three package deliverers have invested a combined $230 million during the past year in various wireless initiatives.

"The reason you want data collection to be wireless is so you can get information [to customers] in real time," said Donald Broughton, an analyst at A. G. Edwards & Sons Inc. in St. Louis. "For shippers, it's not just the speed at which you move their goods from Point A to Point B, but it's also how much real-time data you can provide them on an item."

FedEx Ground in Pittsburgh, which described its $80 million project as the largest non-facilities investment in the company's history, plans to use the system to provide shippers with more detailed real-time tracking and delivery confirmation information, said Roman Hlutkowsky, the company's managing director of operation technology and support.

To support the effort, FedEx Ground plans to equip its 9,000 drivers with handheld Star II scanners from Symbol Technologies Inc. in Holtsville, N.Y. The scanners will be used to electronically capture delivery information, including signatures, and will transmit data over the wireless network from an in-truck computer.

Atlanta-based UPS is in the midst of rolling out an advanced packet-data network and wireless clipboards to 50,000 of its 60,000 drivers to quickly capture on-the-spot delivery information many shippers now view as essential to conducting e-commerce.

For its part, Seattle-based Airborne has earmarked $50 million — the biggest single technology investment in its history — to provide its drivers with portable terminals that will feature digital signature capture hooked into a nationwide packet-data network.

UPS already transmits 3.2 million packets of information each day over a wireless network operated by Motient Corp. in Reston, Va., while executives at FedEx Ground said they plan to use a packet network provided by Cingular Wireless in Atlanta.

Airborne has also signed a deal with Cingular for interim service until it finalizes a carrier for the network later this year.

UPS and FedEx are at the forefront of deploying wireless technology, while Airborne and DHL Worldwide Express in Redwood City, Calif., are "not at the same level" as the leaders, said John Fontanella, an analyst at AMR Research Inc. in Boston. ▶

AT A GLANCE

Battleground

A primer on the contest among three major delivery firms:

- Airborne, FedEx Ground and UPS have put a total of $230 million into wireless dispatch and data-collection systems.
- Driver terminals are designed to support digital signatures.
- Packet networks used by all three have to be supplemented by cellular or satellite systems to provide nationwide coverage.

Keep Wireless Simple, Corporate Users Advise

Landstar, Sabre to roll out service in six months

BY BOB BREWIN

Murray Kennedy, a truck driver for Landstar System Inc., needs to make only seven keystrokes on his wireless data phone to search for and find a load, determine its destination and compute his revenue, thanks to a wireless information system developed by Landstar within just six months.

Kennedy, an independent owner/operator — or business capacity owner, as Jacksonville, Fla.-based Landstar calls it — said the wireless system has already enabled him to increase his revenue by 10% since it went live last month and has made it a lot easier to manage a business that has no fixed address.

"I can access information as I'm going down the road," Kennedy said, instead of having to find a truck stop that's equipped with data ports to dial into a Landstar Web page.

One reason drivers find the system so easy to use is that they "were involved in the process from concept to completion," said Patrick Wise, vice president of e-commerce at Landstar. "They defined the business problem and success criteria."

Because wireless phones have small screens and only rudimentary keyboards, the Landstar information technology department needed to develop a system that would minimize driver interaction, Wise said. "We needed to make it simple, input as much information up front as possible and build in usability," Wise said last week at a panel discussion on corporate wireless data systems at the Cellular Telecommunications Industry Association Wireless IT conference in Santa Clara, Calif. Driver feedback resulted in the development of a simple interface for Wireless Application Protocol-based cell phones.

Wise said anyone planning to design a wireless information system should concentrate on the processes, not the technology. "It's not about technology. . . . It's about delivering business value," he said.

Nicholas Pinciotti, product manager of wireless service at Sabre Business Travel Solutions in Southlake, Texas, said he agrees with the keep-it-simple approach. Sabre rolled out a wireless service aimed at business travelers in major corporations in the same six-month time frame. The key factor in designing a wireless Web application is to manage user expectations so there's no attempt to duplicate a richer wired Web experience, said Pinciotti.

Sabre provides its information to global travelers, and Pinciotti said the company designed its wireless system with that in mind. No international corporation can afford to design a system that is "U.S.-only," he said. "You must have global presentation of data, and it should be multilingual."

Tim Scannell, a Quincy, Mass.-based analyst at Mobile Insights Inc., agreed that the simple approach to wireless works well with vertical applications in industries such as transportation, especially when accessing relatively static data. Complexity sets in with devices that tap into information from multiple sources and increases when working in a "real-time, always-on basis," Scannell added. ▶

LESSONS LEARNED

Wireless Web Design

Keep it simple. It's the process, not the technology.

Design applications for small screens and the limited keypads of cell phones.

Reduce input tasks by incorporating them in the back-end system design.

Involve users in the process.

Think globally. Multinationals need to build global, multilingual applications.

Microsoft Considering Palm Devices for .Net-Based Apps

BY MATT HAMBLEN
LAKE BUENA VISTA, FLA.

Microsoft Corp. CEO Steve Ballmer said here last week that the software vendor, as part of its new Internet-based .Net computing services strategy, will try to put applications such as Word and Exchange on Palm Inc.'s market-leading handheld computers and other mobile devices that compete with Microsoft's own Pocket PC technology.

MICROSOFT'S Ballmer wants to expand .Net

"No offense to the Pocket PC, but we might need to bring .Net services to Palm and other [handheld] devices," Ballmer said during a question-and-answer session in front of an audience of about 7,000 information technology managers at Gartner Group Inc.'s Symposium/ITxpo 2000 conference.

Embracing the rival Palm devices would be "a logical business strategy" for Microsoft, said Tom Austin, a Gartner Group analyst. "Microsoft might have been [hoping], 'If we close our eyes, Palm will go away,' but in this case, they haven't," Austin said.

More than 7 million Palm devices are currently in use. ▶

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BRIEFS

Partner Sues L&H

Speech-recognition software vendor Lernout & Hauspie Speech Products NV (L&H) last week said it is being sued by automotive supplier Visteon Corp. over a joint-venture deal announced by the two companies in April. Visteon is claiming that Belgium-based L&H violated the terms of an agreement to set up a jointly owned Internet portal to provide integrated speech products and technology dedicated to the automotive industry. L&H denied Dearborn, Mich.-based Visteon's allegations. L&H is being investigated by the Securities and Exchange Commission for allegedly inflating its sales.

Macau Opens Mobile Market to Competitors

Macau last week awarded its first licenses for competitive mobile phone operators. The move gives mobile customers in the former Portuguese colony on the southeast coast of China a choice of mobile companies for the first time. Macau awarded licenses to Hutchison Telecommunications Ltd. and SmarTone Mobile Communications Ltd., both in Hong Kong.

UPS Adds Logistics, E-Commerce Center

UPS e-Logistics Inc., a subsidiary of Atlanta-based United Parcel Service of America Inc., has selected Elizabethtown, Ky., as the site for its new 400,000-square-foot Logistics and Technology Center. The company said the facility, scheduled to be completed next year, will play a key role in the development of a nationwide distribution network to serve e-commerce companies.

Bell Helicopter, IBM In Outsourcing Deal

Under a six-year, $75 million outsourcing deal announced last week, IBM will provide desktop technologies and support to Fort Worth, Texas-based Bell Helicopter Textron Inc. Under the agreement, IBM will offer a range of support services to Bell Helicopter, including help desk, networking and systems availability services.

Portals Promise Smart Way to Route Trades

New system heightens exchange efficiency

BY MARIA TROMBLY
NEW YORK

Wall Street's information technology professionals learned about a new kind of trading system at a technology conference here last week: a portal-based system that could have enormous potential in changing the way trades are placed.

According to Craig Shumate, president of research and consulting firm Clearnet, a division of Morris Group for Information Technology Inc. in Mendham, N.J., new trading portals eliminate the need to choose between stock exchanges, electronic communication networks (ECN) and other trading systems by going to all of them to find the best match for a trade. "It is going to change the way orders are routed and tracked," Shumate told attendees at the Wall Street Technology Association's Hot Trading Floor Technologies conference.

Applying Pressure

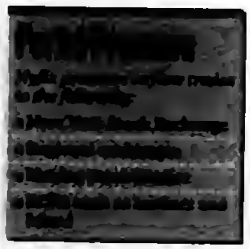
One provider of such a system, Stamford, Conn.-based Nyfix Inc., just went live earlier this month, he said. Other systems, including New York-based Bloomberg LP's Tradebook system, are also moving in that direction. That's putting pressure on traditional market participants such as stock exchanges, he said.

For example, in order to maintain their order flows, the exchanges might be forced to lower their prices, Shumate said. Meanwhile, ECNs have begun to link their networks, said Dana Stiffler, an analyst at Meridien Research Inc. in Newton, Mass.

Both approaches — the front-end systems like that of Nyfix and the network links being established by the ECNs — will improve the prices available to investors, she said. "But I don't know which one will win in the end," she added.

According to Shumate, the emergence of trading portals is removing pressure from the Securities and Exchange Commission to create a central limit-order book, which would provide one place to keep track of all orders. However, Alan Lloyd Paris, e-business development manager at PricewaterhouseCoopers in New York, said the trading portal is a "one-sided solution."

Paris said, "The whole point of a central limit order book is that there is price transparency." Trading portals, however, keep their trades private.



GM Shifts Safety Research Into High Gear

Plans to study effects of in-vehicle gadgets

BY LEE COPELAND
DETROIT

As demand for its in-vehicle communications systems heats up, General Motors Corp. wants to fuel research on curbing driver distraction resulting from such services on the roadways.

The Detroit-based automaker last week launched a $10 million, three-year study to delve into the risks of distraction posed by telematics, or in-vehicle communications systems, such as new electronic dashboard gadgetry and services. Analysts said research into ensuring driver safety is critical for the world's No. 1 automaker and leading telematic services provider.

GM unveiled the SenseAble Driving initiative at the Convergence 2000 telematic technology conference here. The automaker hopes to educate motorists on "how to drive responsibly and what they can do to manage potential distractions in the vehicle," said Mark Hogan, president of the company's e-GM Internet services unit. But he noted that the study will also look into ways to improve telematic technology.

Besides funding research, GM plans to launch a public-awareness campaign that will utilize the research results. The automaker said it will work with Michigan's secretary of state and pilot the initiative by year's end, rolling the program out to additional states next year.

The National Highway Traffic Safety Administration estimates that 25% of an average of 6 million reported crashes each year involve driver distractions such as cell phone usage and that roughly 40% of drivers operate cell phones while driving. Legislation to curb that is under consideration in several states, including Massachusetts.

GM may not be alone in its endeavor. Sources close to Ford Motor Co. said the Dearborn, Mich.-based automaker plans to launch a research wing to look into safety concerns early next year.

GM has already built some safety features into its OnStar in-vehicle system, such as voice-activated commands and a minimum number of steps to operate the system. Communiport Mobile Productivity Center from Troy, Mich.-based Delphi Automotive Systems Corp., which also uses a voice-activated dashboard port, will soon be offered in GM cars. Communiport was developed with Palm Inc. in Santa Clara, Calif.

Other "safe" devices are also in the works. A dashboard device, developed as a demonstration for Convergence 2000 to showcase Microsoft Corp.'s Car .Net development platform, used voice-activated commands and a touch-activated color panel. The device was equipped with a safety lock that would disengage the screen unless the vehicle was in park.

GM's Task at Hand

Hands-free operation is likely to withstand any government regulation of screen-based telematic systems, said Dawn McGreevey, an analyst at Gomez Advisors Inc. in Lincoln, Mass.

Jeremy Schwartz, an analyst at Forrester Research Inc. in Cambridge, Mass., said it's critical for GM to ensure that its telematic services don't create additional hazards for drivers.

"GM knows that there is a spectrum of government intervention in this area . . . so they would prefer to be proactive in dealing with safety features," he said.

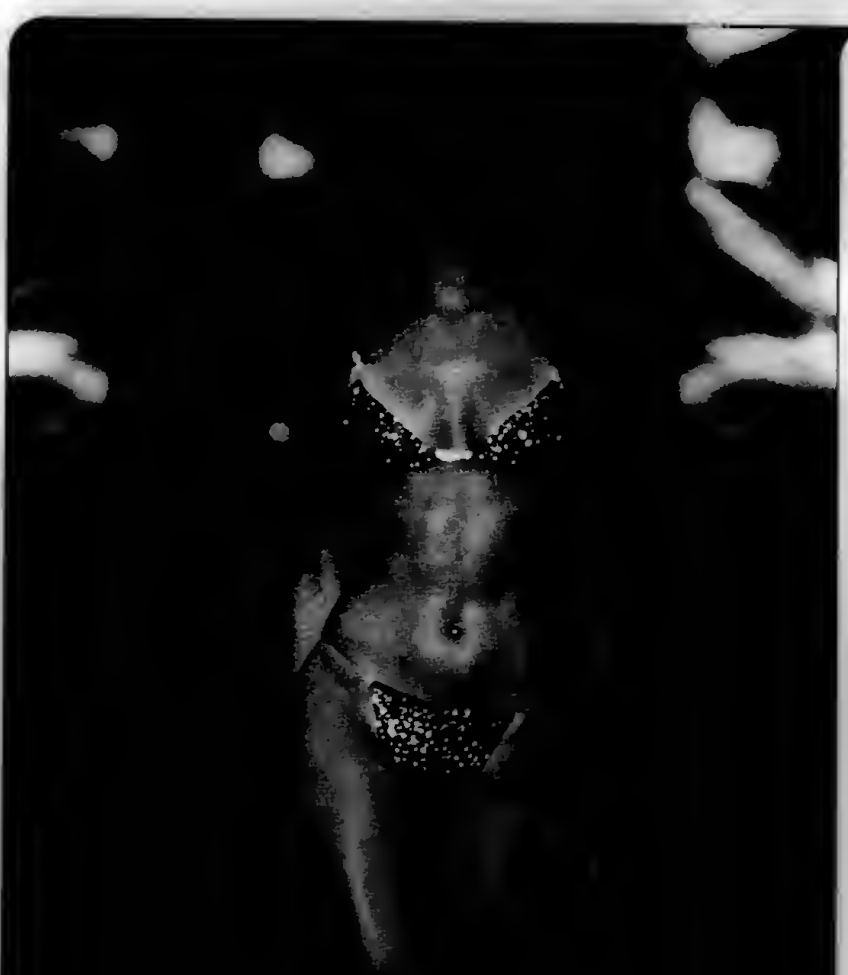
GM launched OnStar in 1996 and today equips 32 of its 54 vehicle lines with the system. About 400,000 car owners subscribe to OnStar, which uses Global Positioning System technology combined with cellular calling to provide subscribers with emergency roadside assistance and concierge services. GM officials said they weren't aware of any incidents attributed to driver distraction resulting from OnStar usage.

AT A GLANCE

GM Fuels Safety Study

The automaker hopes to learn the risks of telematic devices.

- GM will spend $10 million on the SenseAble safe-driving initiative
- It will conduct a three-year study on driver distraction from gadgets such as cell phones and telematic devices
- The initiative will include advertising and public-service announcements
- Study results will be shared with Michigan's secretary of state this year and other states next year



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Industry Debates Need for Worldwide Security Regulations

Some fault IT for not taking initiative

BY PATRICK THIBODEAU

At the first Global InfoSec Summit here last week, a lot of attention was focused on hackers and crackers and whether laws around the world are strong enough to do anything about them. But not everyone at the conference said they blamed the obvious bad guys.

William Caelli, who heads the school of data communications at Queensland University of Technology in Brisbane, Australia, said responsibility for many security problems rests with insecure software being produced by the information technology industry.

"There is no evidence that industry has ever done anything that has involved extra cost unless mandatorily told," said Caelli, who argued for security regulations.

Betty Shave, head of the international computer crime division at the U.S. Department of Justice, said the government's view is to let self-regulation work. "We won't be prescriptive in a way that is ... harmful to business," she said.

The conference was sponsored by the Arlington, Va.-based Information Technology Association of America and the World Information Technology and Services Alliance, a Vienna, Va.-based group that represents high-tech trade associations worldwide. The summit took a bird's-eye view of security issues and revealed that many countries remain far apart in their approaches to cybersecurity.

For instance, according to a preliminary analysis of 44 nations by Bruce McConnell, who operates consulting firm McConnell International LLC in Washington, more than half of the countries studied lack any computer crime laws at all.

For businesses, the absence of specific laws dealing with information security creates an element of risk and uncertainty. "I don't think there is a resistance [to computer specific laws]; it's more of a lack of awareness," McConnell said.

Many countries that do prohibit breakins of government computer systems don't extend those same legal protections to the private sector, said McConnell, a former White House official who led the International Y2k Cooperation Center in Washington. But "as a general matter, the penalties are very weak," he noted.

Some attendees said they're worried about the Uniform Computer Information Transaction Act, the controversial software licensing law being considered by states throughout the U.S. The law may allow vendors to prohibit the reverse-engineering of software — something security experts often do to search for problems.

But Steve Katz, chief information security officer at New York-based Citigroup Inc., said industry groups, such as the Washington-based Banking Industry Technology Secretariat, can put pressure on vendors to ensure that software is examined. ▶

Security Holes

Many countries lack computer crime laws, creating uncertainty for companies.

▶ **In a survey commissioned by the Information Technology Association of America, 70% of 1,000 respondents said they wouldn't feel safe using digital signatures.**

Experts Predict Rise In Severe Web Attacks

Say disgruntled insiders represent big threat

BY PATRICK THIBODEAU

Two cases of massive distributed denial-of-service (DDOS) attacks that knocked out several big e-commerce Web sites earlier this year remain a threat that could grow in sophistication, according to experts at the government sponsored National Information Systems Security Conference here last week.

DDOS attacks entered the public consciousness in February when commercial sites like those of eBay Inc. and Buy.com Inc. were brought down by an overwhelming flood of traffic.

Tom Longstaff, manager of research and development at Carnegie Mellon University's CERT Coordination Center in Pittsburgh, said DDOS attacks haven't disappeared and warned that the severity of attacks could increase.

In a DDOS attack, an intruder breaks into a system, turns it into a "zombie" and then uses that system in the attack. There are now indications that worms are being used to automatically propagate zombies, creating large numbers of attackers, Longstaff said.

A DDOS attack utilizing a worm will spread "much more quickly, and it is much more difficult to trace back to the intruder," he added.

According to experts at the conference, there are no adequate mechanisms for stopping DDOS attacks.

However, the major concern among attendees at the annual event remained insider threats from disgruntled employees.

The attention being given to external threats may be affecting the ability of government agencies to respond to insider threats, said Lee Brandt, a network security officer at the Federal Railroad Administration in Washington. "The internal threat is still the big threat. [but Congress] is concentrating on the external threat," he said.

The biggest threats to corporate systems are from foreign governments, competitors and insiders, said Jeff Moss, a security consultant and the founder and organizer of Def Con, the annual underground convention attended by hackers, security experts and law-enforcement officials.

Information technology managers also share some of the blame for the risks faced by companies, experts said.

"The No. 1 problem in security today is still staff that do not keep their systems up-to-date," said Michel Kabay, a computer security expert at AtomicTangerine Inc., a consulting firm in Menlo Park, Calif. "Most exploits use known vulnerabilities — and most known vulnerabilities have known fixes, and they are free. The problem lies in organizations where security is not yet assigned a high priority." ▶

Threat Trends

The CERT Coordination Center cites a number of potential security threats:

There's a growing reliance on DSL and cable modem systems by remote users who lack system administrators

The technology used in breakins is rapidly improving

DDOS attacks may gain potency if worms are used to proliferate the spread of zombie machines

Criminal hackers are taking aim at the Internet infrastructure

Increasing Number of Firms Blame Data Loss on Viruses

BY JAIKUMAR VIJAYAN

The number of companies reporting disasters as a result of computer virus infections increased sharply this year, even though users are installing more virus-protection technologies than ever before, according to a recently completed survey conducted by security firm ICSA.net.

The reason? Companies may be relying too heavily on antivirus technologies alone to do the job, without paying enough attention to more generic and basic security measures such as e-mail and file attachment filtering and simple Web browser and word processor application changes, said Peter Tippett, ICSA's chief technology officer.

"It's probably better for companies to focus on more generic protection than on updating their antivirus protection [alone]," said Tippett.

Such efforts are especially crucial at a time when new virus strains capable of spreading much faster than previous ones are proliferating, he said.

Reston, Va.-based ICSA conducted the survey this past summer. More than 300 companies, mainly in North America, were polled; each firm had more than 300 computers.

The survey's sponsors include Minneapolis-based Gantz Wiley Research Consulting Group, Santa Clara, Calif.-based Network Associates Inc. and Cupertino, Calif.-based Symantec Corp.

The following were among the survey's findings:

- The loss of productivity associated with virus attacks for a typical company surveyed costs between $100,000 and $1 million.
- Forty percent of companies reported data loss due to viruses, up from 17% in the previous year's survey.
- Two-thirds of companies experienced file problems from viruses, up from 50% in the previous survey. ▶

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BRIEFS

Buy.com Agrees To Settle Lawsuit

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Appeals Court Mulls Special Tech Hearing

Judges seek help on technology basics in government vs. Microsoft antitrust case

BY PATRICK THIBODEAU
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THE D.C. CIRCUIT Court of Appeals judges who will consider Microsoft Corp.'s appeal of the order to break up the company are looking at holding a special, if not unusual, hearing designed to give the panel a basic education on computers before it tackles the technical issues raised by the landmark antitrust case.

The appeals court last week issued an order notifying Microsoft and the U.S. Department of Justice (DOJ) that it wants to bring in Michael Hites, chief technology officer at the Illinois Institute of Technology in Chicago, to conduct "a review session on the fundamentals of automation."

Mark Langer, a clerk at the appeals court, said the intent of the hearing would be to review technologies such as "RAM, hard drive, wide-area networks — basic, basic stuff." But an agenda for the proposed hearing hasn't been set yet, and Langer said the session may well be closed to the public.

'Descriptive' Hearing

In last week's order, the Court of Appeals — which began its proceedings in the antitrust case last month after the U.S. Supreme Court decided not to directly hear Microsoft's appeal — said the hearing with Hites would be "descriptive only," focusing strictly on basic concepts.

The review session "would not address any of the issues presented in [Microsoft's] appeals," the court added.

In an e-mail exchange last week, Hites referred most questions about the proposed hearing to the appeals court. But Hites, who earned a Ph.D. in mechanical and aerospace engineering at the Illinois Institute of Technology and has worked there since 1996, noted that the hearing's focus would be on basic computing issues.

"I have been asked ... to provide a straightforward review of the fundamentals of automation," Hites said.

Neither the appeals court nor Hites would explain how he was chosen.

The order proposing the technology review said two representatives from each side in the antitrust case will be allowed to attend the review session. But the entire matter may have caught Microsoft and the DOJ by surprise.

Microsoft spokesman Jim Cullinan said company executives aren't sure exactly what the order from the appeals court means and that the company "will find that out and respond to the court appropriately."

Meanwhile, the DOJ, which brought the case against Microsoft along with 19 states, declined to comment on the proposed hearing.

"The characterization of what the technology does and how it functions involves substantive judgments that are relevant to the case," said William Kovacic, a visiting professor of antitrust law at George Washington University here. "I'll be intrigued to see how the court goes about reigning in the temptation of the parties to use Nov. 14 as the beginning of the oral arguments [over Microsoft's appeal]."

School's In

The court that will hear Microsoft's appeal of its antitrust case has asked a computer expert to give it a primer on basic computing operations.

WHAT'S NEXT?
Oct. 25: Microsoft and the government will submit briefs telling the court what they think of the court's idea to bring in an expert, chief technology officer at the Illinois Institute of Technology. The hearing is set for Nov. 14.

CLOSED DOOR?
The judges may hold the hearing in private.

WHO WILL BE THERE?
The seven appeals judges and the expert. Microsoft and the government will each be allowed to send two representatives, an attorney and a technology expert.

$1B Outsourcing to Aid Bank Restructuring

BofA off-loads HR and AP to Exult

BY JULEKHA DASH

Bank of America Corp.'s recent outsourcing agreement with Irvine, Calif.-based Exult Inc. is expected to bolster its restructuring efforts by cutting costs and streamlining processes in its human resources and accounts-payable operations, according to analysts.

Last week, the Charlotte, N.C.-based bank announced that it signed a "memorandum of understanding" with Exult. Though the two companies aren't expected to finalize the the pact for another 60 days, the two sides are negotiating a 10-year, $1 billion deal that's expected to cut the bank's annual human resources and accounts payable costs by 10%.

The deal is also expected to present Bank of America with new revenue opportunities, such as delivering financial products and services to other Exult clients, said Mary Lou Cagle, a business transformation executive at the bank.

As part of the deal, Exult is planning to create a self-service human resources portal for the bank's 150,000 employees during the next 18 months, said Cagle. Self-service human resources applications are designed to enable employees to access and update their personnel and benefits information online without having to involve human resources staff.

In July, the bank announced plans to lay off 9,000 to 10,000 employees in the next year and to expand its investments in three major technology areas — credit-card and business-to-business payment systems, e-commerce and Web-enabling branches and call centers [News, Aug. 7].

Marc Pramuk, an analyst at International Data Corp. in Framingham, Mass., said the agreement with Exult should also alleviate some of the burden Bank of America faces with integrating its operations with NationsBank Corp., with which it merged in 1998. Consolidating human resources processes is a complex task in mergers, said Pramuk, so Exult will need to eliminate redundancies and reconcile the human resources policies of the two banks and any other acquisitions they haven't fully absorbed.

A Bank of America spokeswoman said roughly 900 of its 1,000 human resources staffers will be transferred to Exult. Most of the other 100 people are call-center workers who will be absorbed into similar positions at the bank, she said.

Banking on Savings:

Bank of America/Exult deal:

- Companies will finalize the $1 billion, 10-year pact within 60 days.
- Bank of America will acquire 5 million shares of Exult stock and an option to purchase another 5 million.
- 800 to 900 of the 1,000 workers at the bank's human resources department will be offered jobs at Exult.

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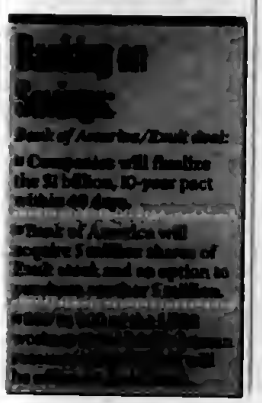
In July, the bank announced plans to lay off 9,000 to 10,000 employees in the next year and to expand its investments in three major technology areas — credit-card and business-to-business payment systems, e-commerce and Web-enabling branches and call centers [News, Aug. 7].



Marc Pramuk, an analyst at International Data Corp. in Framingham, Mass., said the agreement with Exult should also alleviate some of the burden Bank of America faces with integrating its operations with NationsBank Corp., with which it merged in 1998. Consolidating human resources processes is a complex task in mergers, said Pramuk, so Exult will need to eliminate redundancies and reconcile the human resources policies of the two banks and any other acquisitions they haven't fully absorbed.

A Bank of America spokeswoman said roughly 900 of its 1,000 human resources staffers will be transferred to Exult. Most of the other 100 people are call-center workers who will be absorbed into similar positions at the bank, she said. ▸

An OLTP database might work for data warehousing,
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Microsoft Pushes Patch for ISS Hole

Flaw discussed on Internet before hacker finally tips off vendor

BY ANN HARRISON

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Continuing Vulnerability

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What Needs the Patch

Microsoft says a previously developed patch is the fix for this hole.

AFFECTED SOFTWARE VERSIONS	PATCH AVAILABILITY
Microsoft IIS 4.0	www.microsoft.com/ntserver/nts/downloads/critical/q269862/default.asp
Microsoft IIS 5.0	www.microsoft.com/windows2000/downloads/critical/q269862/default.asp

Continued from page 1

Amdahl

As a result, Amdahl, a subsidiary of Tokyo-based Fujitsu Ltd., won't be extending its current line of 31-bit IBM S/390-compatible mainframes, said Carol Stone, a vice president at Amdahl.

The Sunnyvale, Calif., company will cease manufacturing these systems in March 2002, though it will continue to support its installed base through March 2007, Stone said.

Amdahl plans to focus all hardware investments on Fujitsu-branded Unix systems using Sun Microsystems Inc.'s UltraSPARC-based technologies, Stone said.

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"We decided the smartest business decision for us would be to direct our investments to the open-systems market instead," Stone said.

"I'm stunned," said Dan Kaberon, a parallel sysplex manager at Hewitt Associates Inc., a major mainframe user in Lincolnshire, Ill.

"Amdahl has been a creative force that has propelled so much of the industry over the years ... it's sad to see them go," Kaberon said. Innovations such as Amdahl's partitioning technology — for running multiple operating systems and applications in separate partitions within a single box — not only put pressure on IBM but were also widely copied by other vendors, he said. "There's no second-best alternative to competition. it makes everyone better, faster and cheaper," he added.

Amdahl's exit is an unfortunate — but not unexpected — consequence of slowing mainframe demand and competitive pressures from powerful new Unix servers, said David Floyer, an analyst at ITCentrix Inc., a consultancy in Mountain View, Calif.

For instance, the net growth of installed mainframe capacity has slowed — from more than 33% two years ago to just over 18% last year — while Unix server growth rate has been double that, said analyst Carl Greiner at Meta Group Inc. in Stamford, Conn. "Amdahl was looking at a slowing market and a huge investment to stay competitive," he said.

But Amdahl's decision is bad news for users in a market already depleted by the sudden exit of Hitachi, Floyer said.

Most of IBM's long-term and immediate competition comes from Unix vendors such as Sun, but both Hitachi and Amdahl had enough of a market presence to exert some pressure of their own, analysts said.

Last year, the two firms together accounted for 21% market share, while IBM held 79%, according to Meta Group. With Hitachi's exit, IBM will have an 86% share this year, Meta Group estimated. One result: "Don't expect to see the 30% to 35% price/performance gains that we have been seeing annually," Greiner said.

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MBA Students

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"Venture capital money is drying up for certain dot-coms, and without round-two funding, even good companies die," said Peter Kong, a student at Carnegie Mellon University's Graduate School of Industrial Administration in Pittsburgh due to graduate in December.

School officials said it's too early to tell which companies or industries will be popular this year on campus, and students who were interviewed expressed interest in everything from investment banking to high-tech and new media.

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Victor Penev, a second-year student at Stanford University and co-president of the school's entrepreneurs club, said he expects students to look at a broader range of opportunities — beyond dot-coms — as the recruiting season begins.

"There's a general sobering from the exhilaration last year," Penev said.

Bob Bonner, director of MBA career management at Wharton, said that while "students are thinking more critically about joining that five-person start-up," students' interest in starting their own firms remains high. Courses on entrepreneurship are filled to capacity, and at Stanford, membership in the entrepreneur club has surged 20% this year.

Penev said he intends to start his own new-media company, but only after he has worked for a large multinational firm for the more diverse opportunities it would offer.

Ken Keeley, director of the career center at Carnegie Mellon's business school, said some students who spent last summer at Internet start-ups were concerned that the firms were disorganized or that they wouldn't have the financial resources to pull through.

Less venture funding at Internet start-ups increases the risks and lowers the potential for financial returns for new employees, said Kong.

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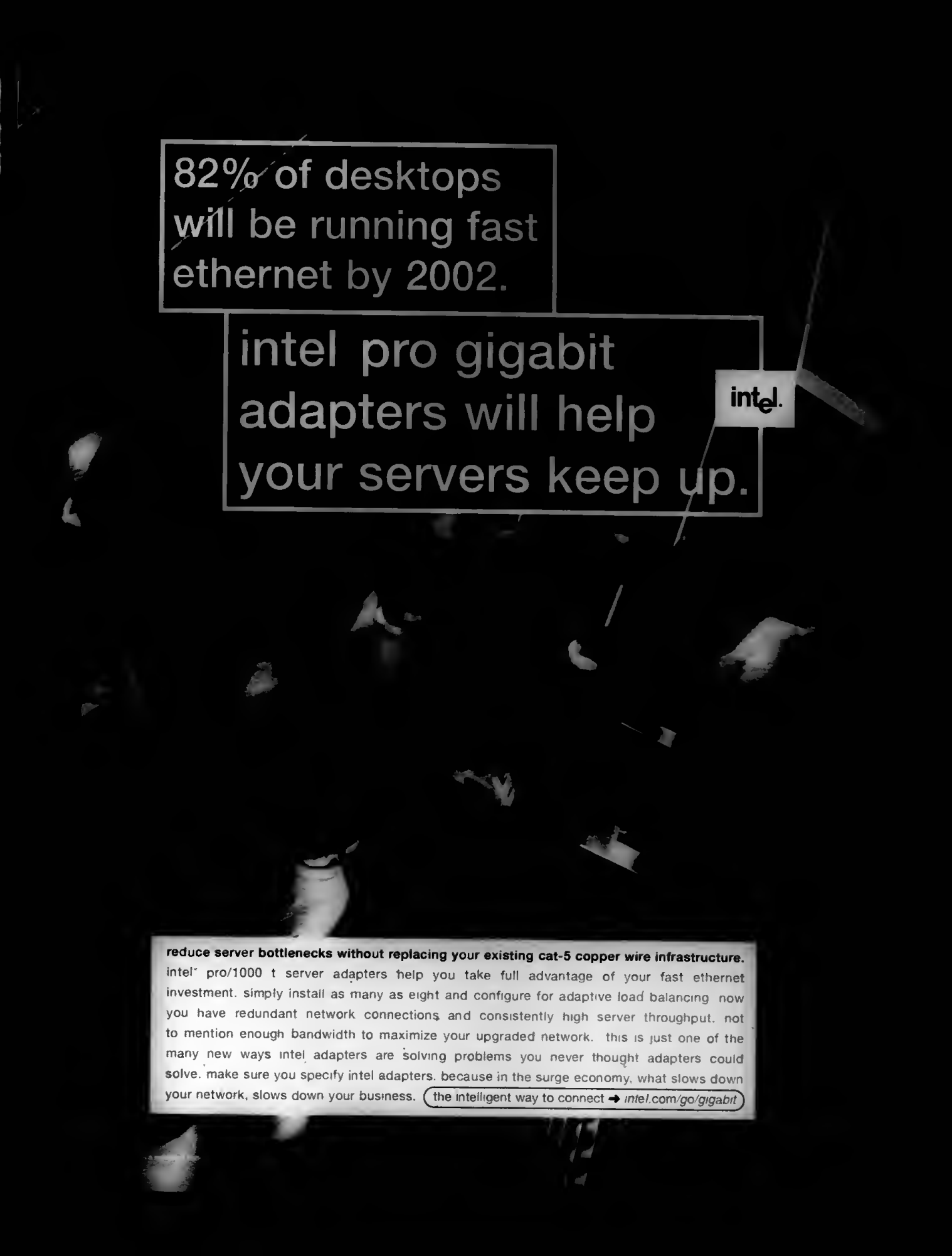
82% of desktops will be running fast ethernet by 2002.
intel pro gigabit adapters will help your servers keep up.
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reduce server bottlenecks without replacing your existing cat-5 copper wire infrastructure.
intel pro/1000 t server adapters help you take full advantage of your fast ethernet investment. simply install as many as eight and configure for adaptive load balancing now you have redundant network connections and consistently high server throughput. not to mention enough bandwidth to maximize your upgraded network. this is just one of the many new ways intel adapters are solving problems you never thought adapters could solve. make sure you specify intel adapters. because in the surge economy, what slows down your network, slows down your business.
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Microsoft SQL Server 2000 Enterprise Edition

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Companies Fight Back Against Internet Attacks

Businesses hire investigators to identify cybercritics, glean market intelligence

BY MITCH BETTS

THIS SUMMER, the Yahoo message boards were full of postings that insinuated that Titan Corp.'s stock was headed south. "Very very bad earnings surprise coming today?" said one. "[Titan] is getting nailed with huge sell orders! Jump the sinking ship," said another, posted by someone with the screen name "CCRibber."

If the goal was to scare investors and drive the stock price even lower, it worked. Messages like that — plus a fake analyst report criticizing Titan — sent Titan's shares plummeting from $44 on June 20 to $21 on Aug. 22. It was a staggering 50% loss in market value, totaling $1.3 billion.

Then Titan got mad.

The San Diego-based high-tech company filed suit on Aug. 30, angrily charging that the posters were "unscrupulous short sellers" who conspired to depress the stock for their own profits. The company got a subpoena to "smoke out" the people behind the three dozen screen names that had torpedoed Titan's stock.

The case hasn't wrapped up, but it's yet another episode in which corporate reputations have taken a real beating from Internet messages, fake press releases and "gripe sites." Of course, critical opinions are legally protected as free speech, but when the messages are false, defamatory or trying to manipulate the stock, corporate America is fighting back.

J. CHRISTOPHER RACICH: Disgruntled employees or stock manipulators are often the perps

To do that, companies are hiring Internet monitoring firms (see box) that use software that scans the Internet to find out what's being said about business clients. They're also hiring private investigators to track the perpetrators.

"We get requests for that all the time," said J. Christopher Racich, director of high-tech investigations at Kroll Associates in Washington. "But it's not something you want to do if you're just aggravated [about the messages], because the investigation can be very expensive" — say, $30,000 to $40,000.

The investigations usually turn up former employees, disgruntled insiders or stock manipulators, Racich said. The big challenge is identifying the people behind the anonymous screen names. A flurry of messages may actually be the work of only one or two people who use different handles to make it look like they're a crowd.

One approach is to file a "John Doe" lawsuit and use subpoena power to obtain the identity of the mischief maker from his Internet service provider. That's what Titan is doing, but it's a strategy that has to be used with caution, Racich warned. "It should be a serious lawsuit, based on a cost/benefit analysis, not just a fishing expedition," he said.

Another technique employs "forensic psycholinguists" — the same folks who analyze hate mail sent to the White House — who look for signs that the messages came from the same poison keyboard.

In one recent Kroll case, a psycholinguist studied 30 messages from two screen names and concluded that they came from the same writer because they had the same format: a question in the headline and the answer in the body. The messages also used the same vulgarities.

Based on the analysis, the psycholinguist surmised that the writer was probably 40, white, professional and perhaps a day trader. Furthermore, the report said, he suffered from low self-esteem and felt his regular job was threatened by the acquisitions of the company he was lambasting.

Private eyes can also engage suspects in online conversations to seek clues about their identities, but there's a danger that the undercover gumshoe could tip his hand or cross the line into entrapment, Racich said.

Michael D. Allison, CEO of Internet Crimes Group Inc. in Princeton, N.J., said there are even better investigation tricks.

For example, perpetrators may have left some electronic footprints behind by filling out a Web site guest book with the same cybersignature they use later for derogatory messages.

Sometimes the text of a message itself provides clues. "If they say it's snowing outside, we'll check [weather records] to find out where on the planet it's snowing right now, to narrow the suspect pool. If they say they have a green Jaguar and live in Rhode Island, we'll get a database that lists every green Jaguar owner in the state," Allison said.

Apparently, companies are willing to go to great lengths to identify Internet content that besmirches their corporate reputation or infringes on their intellectual property.

The Associated Press news wire service in Washington hired Cyveillance Inc. in Arlington, Va., to identify Web sites making unauthorized use of copyrighted articles.

And Nintendo of America Inc. in Redmond, Wash., retained Cyveillance to identify pornographic Web sites that use its video-game brands such as Pokemon or Mario Bros. to draw visitors to their sites.

"We are continuously working to have all Nintendo content removed from URLs, metatags and Web pages of the inappropriate sites identified by Cyveillance," Nintendo spokeswoman Beth Llewelyn said. Nintendo will take legal action if the Web site operators don't cooperate, she added.

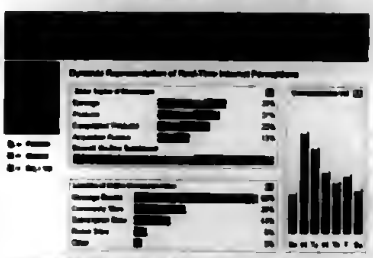
Cyveillance uses both human and artificial intelligence to monitor "online brand abuse" for clients. First, the company's Web crawler looks for information that meets customer-defined criteria. Then a team of e-commerce analysts studies the automated reports and recommends a plan of action. The cost ranges from $80,000 to $400,000 per year.

But such services can be used for much more than just defending against defamation and piracy. "Clients start off having a defensive mind-set, but then they transition to more of an offensive approach," said Brian H. Murray, director of Cyveillance's strategy center.

In other words, they begin to use Internet surveillance for benchmarking and competitive intelligence, such as finding out when a competitor adds a new feature, like online customer chat, to its Web site.

Internet surveillance can even help companies gather soft information like "marketing buzz" from the world's largest focus group.

NetCurrents Inc. in Burlingame, Calif., uses artificial-intelligence technology that scans Internet message traffic in order to provide a real-time graphical display of public sentiment about a company. Positive messages show up as a green bar, and negative ones as a red bar. But NetCurrents may not stop there. Theoretically, the technology could be used to gauge customer reaction to a new product or voter reaction to a presidential debate.



NETCURRENTS' "perception meter" provides a real-time display of public sentiments about clients

"You get an ongoing perception meter," said Irwin Meyer, chairman and CEO of NetCurrents. He's now testing the technology on Internet discussions about TV programs, in which fans of particular shows chat about the pros and cons of plot lines, actors and even clothing.

"The key is that it's real time," Meyer said. "We could deliver a report the following morning, in time to alter scripts or kill off a character that nobody likes."

Cybersleuths

A sampling of Internet monitoring and investigation firms that can help companies manage their reputations and fight online brand abuse:

Internet monitoring

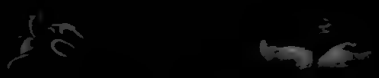
- CyberAlert Inc. *(www.cyberalert.com)*
- Cyveillance Inc. *(www.cyveillance.com)*
- eWatch unit of PR Newswire Inc. *(www.ewatch.com)*
- NetCurrents Inc. *(www.netcurrents.com)*

Internet investigations

- Decision Strategies Fairfax International *(www.dsfx.com)*
- Internet Crimes Group Inc. *(www.internetcrimesgroup.com)*
- Kroll Associates *(www.krollworldwide.com/serv_eeci_thcc.cfm)*

WE'VE GOT JUST ONE SMALL DETAIL FOR YOU TO REMEMBER WHEN YOU PLAN FOR BUSINESS CONTINUITY.

WHAT HAPPENS WHEN PLAN B FAILS?



SUNGARD SECURE

SUNGARD

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dd data storage capacity, hire the right people to productively
that data er to complete data backup and restore. That's why
eNetworks provides an on-demand data storage infrastructure,
etwork and software solutions that ensure secure, scalable and
accessible data storage, and, of course, the expertise to make it all
come together. This way, we save you from the distracting and costly
task of storing, protecting and managing your data. In fact, we do this
better and more cost-effectively than you ever could yourself. Allowing
you to focus on leveraging your information and honing your competitive
edge. To learn more about our secure, scalable, "easy-to-access"
approach to data storage, visit us at www.STORAGENETWORKS.com

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Brokerages Put Plenty of Stock in Wireless Devices

Projections of returns are mixed, but firms say technology has come a long way

BY MATT HAMBLEN

IN THE MID-1990s, data-center managers at Fidelity Investments in Boston were receiving alerts of system errors on their personal pagers. That application made them think, What if we could alert retail stock-trading customers via pager when a stock fell or rose to a certain level?

WALL STREET WATCH

"It was a great idea, but there wasn't enough technology to support it back then," said Joseph Ferra, senior vice president at Fidelity's online brokerage division.

But wireless technology, encryption and network coverage evolved, and Fidelity rolled out wireless services for retail customers in October 1998. Two years later, Fidelity boasts 100,000 retail customers — 2.5% of its online total — using all sorts of handheld devices to monitor stock and 401(k) portfolios, receive alerts and respond with actual orders to buy or sell, according to Ferra.

Today, analysts say they consider Fidelity a leader among approximately 50 online brokerages that provide wireless retail services.

Wireless retail-trading options have grown wildly in the past two years, and brokerages will soon extend the services in many ways, such as to institutional investors managing large portfolios. They're also likely to add other types of content to their portals, brokers and analysts said.

But not everyone sees all of this investment as wise. None of the brokerages offering wireless services described here would discuss whether they have seen a return on their investment. And Meridien Research Inc. in Newton, Mass., projects that brokerages might get no more than 5% of online trading over wireless.

"The rich, the young and the reckless are the feeder system for expanded mobile financial services," wrote Meridien analyst Randi Purchia in a recent report.

"Once you get outside Wall Street and Silicon Valley, it's hard to find people excited about trading stocks while riding the bus," said Carl Zetie, an analyst at Giga Information Group in Cambridge, Mass.

Zetie said some brokerages are hesitant about offering wireless because they are worried that the return on investment won't be there.

But other analysts said they agree with the brokerages already in the mix that adding the service will bring in new customers or provide more trades.

"Even if an established customer makes two more trades a month because of wireless, that's valuable," said Jack Gold, analyst at Meta Group Inc. in Westboro, Mass.

Charles Schwab & Co. said it expects half of its trading to be conducted over wireless devices in three to five years, though it won't disclose how many wireless users it has now or expects then. Yet this early Internet leader lost the initial wireless round to Fidelity.

"Back in 1998, Fidelity was considered so stodgy after Charles Schwab & Co. had run rings around them on the [wired] Internet, but Fidelity saw the potential of wireless and started off with Research in Motion pagers and now has even partnered with a number of carriers to expand services," said Ed Kountz, an analyst at TowerGroup in Needham, Mass. "Fidelity is definitely the most successful in not only identifying with this cutting edge technology, but for doing a lot to get content out there on all kinds of handheld devices."

But San Francisco-based Schwab is back in the running as part of an aggressive pack of companies offering wireless trading, Kountz said. Its wireless access is part of an integrated system that includes telephone brokers and online services that allow customers to see entire spreadsheets of portfolio data on a desktop screen, said Jonathan Craig, vice president of marketing for global wireless at Schwab.

The attitude at Schwab is very much toward using wireless to supplement other services, said Craig.

Unlike Fidelity, which built its wireless applications in-house because integrators didn't have the needed expertise at the time, Schwab built only some pieces — including the user interface — in-house. It hired Aether Systems Inc. in Owings Mills, Md., to bring the service to handhelds from Santa Clara, Calif.-based Palm Inc. and pagers from Waterloo, Ontario-based Research In Motion Ltd., said Nasos Topakas, vice president of global wireless technology at Schwab.

Usage Spike

Consumer use of wireless technology has increased.

- Average household wireless usage per month, 1999: 55 minutes
- Average household wireless usage per day, 2000: 247 minutes
- Most-accessed data: checking account information, followed by e-mail messages via phones and stock quotes

SOURCE: MEYNER RESEARCH NEWTON, MASS.

Three Major Challenges

The three biggest challenges in wireless facing brokerages today are the interface (see related story, next page), how to work with the various carriers in the U.S. and how to build adequate security. And none of these has proved to be as difficult as it first seemed.

The carrier problem seems to be solving itself, with recent mergers resulting in nationwide service helping to expand coverage quickly. The hodgepodge U.S. market has benefits, too: Having a number of carriers has "turned out to be an advantage for us because it gives us a broader customer base," said Glenn Toogue, president of DLJdirect Inc. in Jersey City, N.J.

Ameritrade Holding Corp. became the first brokerage to operate over a nationwide wireless phone network in November of last year, using the expertise of Sprint Corp., said Jim Ditmore, CIO at Omaha-based Ameritrade. It's able to administer all of its carrier relationships with only three in-house technology staffers by keeping all the business logic for how to make a trade the same and changing just the presentation layer for the various wireless handheld devices, said Ditmore.

Maintaining an entire silo of wireless business-logic components would mushroom the staff to 30 people, Ditmore added. Ameritrade has 10,000 wireless users, representing less than 1% of its 1.2 million online users.

Security hasn't been a problem either. The lapse in Wireless Application Protocol 1.1, in which data was momentarily decrypted at the gateway before being encrypted again, theoretically exposing it to hackers, apparently hasn't slowed adoption and is being fixed in Version 1.3.

Analysts and users said retail stock traders usually access an account with a password and then authorize trading within that account, so they aren't sending credit-card information over each connection anyway.

SCHWAB's Nasos Topakas says wireless devices aren't too vulnerable: "If something happens and I lose it, then I just disconnect the service"

No Great Risk

The brokerages use a variety of measures to secure their transactions. Fidelity, for example, relies on elliptical-curve cryptography. DLJdirect relies on security built by its own 500-person in-house technology company, iNautix Technologies Inc.

"You would think security over wireless trading would be a major concern, but security hasn't been an impediment" to rollouts of applications, said Dennis Gaughan, an analyst at

MORE THIS ISSUE

Which is the better online brokerage, Schwab or Fidelity? See page 46.

AMR Research Inc. in Boston. "No security is bulletproof, and every [brokerage] has to determine whether the return from the application is worth the acceptable risk. And brokerages have defined the risk as not being that high."

"Security is better on the wireless Web than the wired Web because wireless devices such as cell phones are inherently more secure than PCs," said Ditmore. "Whereas your PC has no serial number that's accessible outside, your cell phone can't be overtaken and has a serial number and you know its location and it authenticates itself to the network. So it is far more secure than a PC."

Schwab's Topakas said that even the device itself isn't particularly vulnerable. "If something happens and I lose it, then I just disconnect the service," he said.

And as some brokerages consider adding new wireless services that are more information-based, the need for security may diminish.

"Trading is just a very small component" of what users want, said Ferra. The rest of them use wireless technology for alerts about market conditions and to get quotes and read-only access to portfolios.

Fidelity envisions going well beyond those services.

For example, it may allow consumers to make 401(k) fund transfers and to arrange hotel, rental car and insurance services with its subsidiaries.

"Our mission statement is to enable wireless access to Fidelity enterprise data, anytime, anywhere, on any device," Ferra said.

Those Darned Tiny Screens

Security isn't a hardship in building wireless trading applications; what brokerages developing wireless applications find most taxing is creating an acceptable user interface for all types of devices, said brokerage officials.

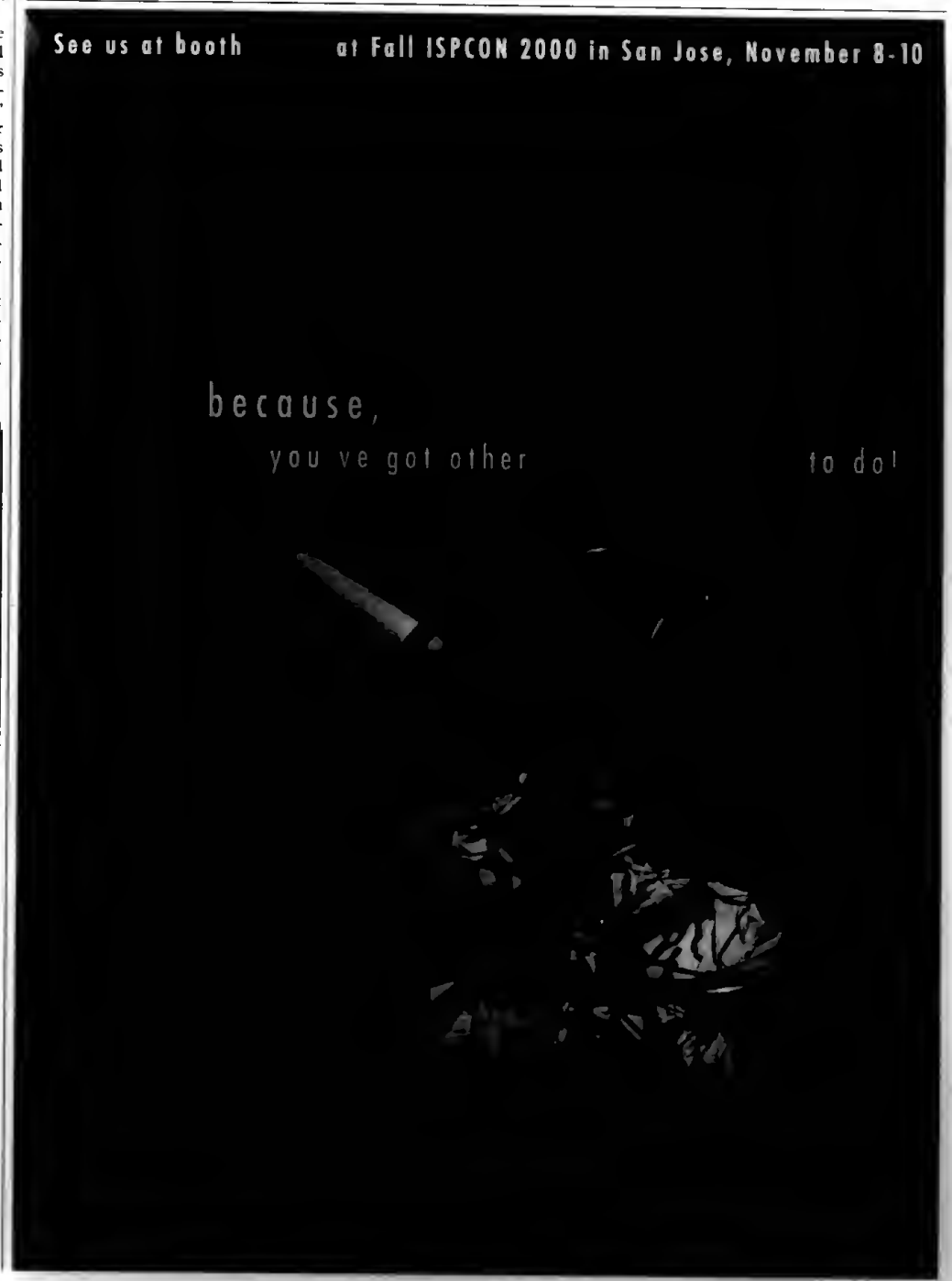
"Most phones have a limited number of lines of display and very limited input/output with numeric keypads," said Glenn Tongue, president of DLJdirect.

DLJdirect is looking forward to more voice activated phones as well wider use of touch screens, something available today with the Palm VII and some other handhelds, for example.

Charles Schwab & Co. in San Francisco relies heavily on finding everyday people to test applications in its laboratory, including people who have never traded or used wireless devices, Schwab officials said.

"If vendors can solve the interface problem with the numerical keypad of the phone, that's going to help," said Jim Ditmore, CIO at Ameritrade. "Voice recognition for phone will overcome the keypad concerns and Third Generation wireless color will help users see graphs and other graphics," he added.

– Matt Hamblen



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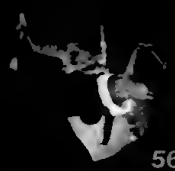

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BRIEFS

IBM Meets Profit Expectations

IBM last week reported that its net profit for the third quarter kept pace with expectations, rising 11% from the year-earlier level of $1.76 billion to reach $1.96 billion. But IBM's third-quarter revenue increased just 3% to $21.8 billion, up from $21.1 billion in the same period last year. CEO Louis V. Gerstner acknowledged that company executives "would like to have seen more revenue in the quarter." However, he said, IBM was held back by three things: an inability to meet demand for its microelectronic components, an unexpected slowdown in software sales last month and reduced demand for S/390 mainframes prior to this month's introduction of the company's 64-bit z900 model.

Intel Stays Strong

Intel Corp. last week followed up last month's warning that weak European demand for PCs would hurt its third-quarter results by reporting a net profit of $2.51 billion for the three months ended Sept. 30. That figure, which excludes $426 million in acquisition-related costs, is up from $1.49 billion in last year's third quarter. The company's third-quarter revenue rose 19% to a record $8.73 billion, up from the year-earlier total of $7.33 billion.

Short Takes

PREDICTIVE SYSTEMS INC. in New York said it will acquire GLOBAL INTEGRITY CORP. in Reston, Va., in a stock and cash transaction valued at approximately $107.6 million. Global Integrity is a subsidiary of SCIENCE APPLICATIONS INTERNATIONAL CORP. in Arlington, Va. . . . Struggling business applications vendor GEAC COMPUTER CORP. in Toronto plans to cut its workforce by about 12% in an attempt to return to operating profitability by next month and prime itself for a potential sale. . . . Storage vendor EMC CORP. in Hopkinton, Mass., said its third-quarter net profit rose 55% over the same period last year to $450 million, while revenue increased 34% to $2.28 billion. . . . PEOPLESOFT INC. in Pleasanton, Calif., announced a profit of $23.4 million for the third quarter, up from $500,000 in the same period last year.

MicroStrategy Taps Voice Technology

Software vendor will deliver personalized information through interactive portals

BY DAN VERTON

BUSINESS-intelligence software vendor MicroStrategy Inc. last week announced an agreement with PriceInteractive Inc. to use that firm's speech-recognition technology to deliver customized business intelligence to customers via any telephone, mobile phone or voice-mail system.

As part of Vienna, Va.-based MicroStrategy's new focus on the Web, it will use Reston, Va.-based PriceInteractive's SpeechPort platform to deliver personalized information to customers through interactive voice portals. SpeechPort will allow customers to tap into any MicroStrategy data warehouse and retrieve information using the basic features of a telephone or cell phone.

Mark Plakias, vice president of voice and wireless commerce at The Kelsey Group, a consultancy in Princeton, N.J., said that voice-portal technology is developing rapidly and that the deal between MicroStrategy and PriceInteractive is an important development for the market.

Adding Value

"Although in one way it is business as usual, since these two companies already had a relationship, this is one of the early examples of high-value-added content being pumped through the voice-portal infrastructure," said Plakias. "The business case for applying voice technologies to mobile knowledge workers is a lot stronger than it is on the consumer side. At the end of the day, it's what people need out in the field."

SpeechPort is delivered through a Java-based service infrastructure that pairs a speech-recognition engine with a carrier-grade telecommunications and wireless hosting facility.

PriceInteractive will also expand its VoiceXML support by integrating MicroStrategy's proprietary Telecaster Markup Language voice browser with the SpeechPort platform. MicroStrategy said this move will allow its customers to easily design and rapidly deploy new applications in a self-service environment.

The deal with PriceInteractive comes only a few weeks after MicroStrategy launched a new Web store and e-commerce initiative that will allow it to automate the bulk of its sales operations and give customers what CEO Michael Saylor called the "self-service" option. The Web store offers video product demonstrations, free software trials and detailed product and pricing information that customers can use to make purchasing decisions.

Although the company's business intelligence products remain strong in the market, new federal revenue-reporting guidelines forced the firm earlier this year to restate its earnings from 1997 to 1999.

The restatements lowered MicroStrategy's revenue figures for the past three years, pushing its stock price into a nosedive. The company saw its stock price drop from $333 per share in March to $27.50 by Oct. 4.

In June, however, MicroStrategy announced that it had received $125 million in new financing, which allayed some concerns on Wall Street. ▶

> [Voice technology is] what people need out in the field.
>
> MARK PLAKIAS, VICE PRESIDENT OF VOICE AND WIRELESS COMMERCE, THE KELSEY GROUP

MORE THIS ISSUE

For more news about voice technology, see page 60.

Fiorina: HP Will 'Play to Win' in PC Market

BY MATT HAMBLEN
LAKE BUENA VISTA, FLA.

Hewlett-Packard Co. takes its PC business seriously and aims to be No. 1 or No. 2 in worldwide PC sales, CEO Carly Fiorina told attendees at Gartner Symposium/ITxpo 2000 here last week.

Fiorina said HP now ranks third in worldwide PC sales, compared with ninth place, which it held when it entered the PC business five years ago. "We're not only making money, but making pretty good money," she said. "We not only think it's a good growth business, but a good profitability business."

HP'S CARLY FIORINA: The goal is to be No. 1 or 2 in PC sales

Fiorina said that analysts and others have talked about the PC marketplace "going off the cliff" but that that view is biased because it looks only at the U.S.

"There's a big world out there," Fiorina said. Laptop sales at HP are "going like wildfire" as U.S. businesses move away from desktop machines, she added.

Another product that promises to be successful is HP's recently introduced e-PC, a PC model with slimmed-down functionality and size that makes maintenance easier and cheaper for corporations. It will be available for less than $500. Compaq Computer Corp., IBM and other manufacturers make similar desktop systems.

Despite HP's success, the U.S. corporate desktop market is "beginning to slow," Fiorina acknowledged. "We, as a company, have to play to win," she added.

Eric Rocco, an analyst at Stamford, Conn.-based Gartner Group Inc., said Fiorina's goal is "an important goal" but it's also one that will require a "very aggressive strategy."

Rocco added that "HP wants to be first or second in all the products it makes, but getting to the top in PCs will require displacing Compaq or Dell, and that will be hard."

Since desktops are more of a "utility" product today, there's little HP can install in them to provide unique features, Rocco said. "HP will have to hope for Compaq or Dell to falter," perhaps in terms of failing to deliver products on time or to provide convenient service, he added.

Rocco and Gartner analyst Paul McGuckin said HP is a very strong company with a bright future, but they noted that the biggest piece of "indigestion" could come with its proposed $18 billion acquisition of consulting firm PricewaterhouseCoopers in New York.

Both analysts said the acquisition, which might be formally completed within a month, could introduce obstacles for HP in integrating people and business models, just as Compaq found it difficult to integrate Digital Equipment Corp.

Analysts also asked about HP's commitment to the application service provider (ASP) model, to which Fiorina responded, "Fundamentally, we won't become a huge ASP ourselves, since that puts us in conflict with ASPs we want to support."

Fiorina didn't rule out having an internal information technology department to sell some small-scale technology services, however. ▶

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MARYFRAN JOHNSON

Time to talk back

NOW THAT THE NEW ECONOMY is aging rapidly — in merciless Internet time — the Old Economy doesn't look quite so lame anymore. No more ducking your head in shame if you've spent more than two years at one company. No more apologizing for having an infrastructure or business processes that actually work. And best of all — blessed relief! — no more sitting there listening to every dot-com know-it-all with advice on how to become a millionaire.

MARYFRAN JOHNSON IS editor in chief of *Computerworld*. You can contact her at maryfran_johnson@computerworld.com.

My e-mail flood from public relations people reflects some swiftly reconfiguring loyalties these days: As more dot-com clients can't pay the bills, the PR client base is shifting back to more established players. One PR firm sent a company pitch the other day that sneeringly referred to failed dot-coms as "dot bombs." Another chimed in with a request that I meet with an experienced fortysomething executive team, and it talked up the midlife managers by shooting down Young Turks like the founder of Napster for pursuing radical, doomed business models.

Suddenly, it's the voice of experience that sounds good again. And that's you, the IT pro, the CIO, the chief technology officer — whatever your business card says. Everywhere I go these days, I find people looking for advice and ideas about the next steps in the e-business revolution. They have lingering questions: How do you integrate the supply chain with that ERP system? How do you sustain relationships with new B2B partners? How do you know which technology to pick and which standards to follow?

You have those answers, or you know where to get them. That's why it's time for you to step up and give advice. Offer insights. Speak before you're spoken to. Talk back.

A story in our Business section last week ["On the Spot," page 56] featured two fiftysomething CIOs giving drop-dead great advice about how they'd tackle a variety of hypothetical management dilemmas. The piece was filled with wonderful ideas on everything from how to scope out the new CEO's agenda to what you should do when employee morale is in shambles.

Underlying everything these CIOs said was the conviction that IT is the ultimate enabler for just about any business innovation happening today. These CIOs know from experience that it won't be any single business model that triumphs, but probably several, with the best merging Old and New Economy technologies.

What I realized while reading their words is that if they — and you — keep quiet, some of the best ideas will go unheard. And that would be a tragedy, whether you're in the Old or the New Economy. ◗

DON TAPSCOTT

It's beginning to look a lot like a wireless world

THE FUTURE OF the World Wide Web is literally in the palms of our hands. Whether it's through smart mobile phones, wirelessly connected PDAs or the myriad variations of these devices that are now being designed, soon almost all of us will be permanently linked to the Net through small, portable devices that we will carry everywhere.

Already on the market are combo mobile phones/MP3 players/FM radios. Nokia predicts that within three years, more than 1 billion mobile phones will be in use around the world — about double the number today.

DON TAPSCOTT is chairman of Digital 4Sight (*www.digital4sight.com*) and co-author of *Digital Capital* (Harvard Business School Press). Contact him at dtapscott@digital4sight.com.

Japan's stunningly successful i-mode service already has more than 13 million mobile phone subscribers — about one of every 10 of its citizens — constantly connected to the Web. More Japanese have wireless Internet access than the rest of the world combined.

If you're skeptical about the wireless Web, you shouldn't be. As these devices surge in popularity, they'll easily eclipse the desktop PC within a few years as the principal gateway to the Net. By 2004, 40% of business-to-consumer e-commerce transactions outside of North America will be initiated from portable, wireless-enabled devices. Yet, growth in mobile commerce won't be as fast in North America in the near future because our wireless devices aren't as sophisticated as those in Asia and Europe. And fewer companies here have developed services targeted at this market.

The major limitation in using a mobile phone today to access the Internet is that the connection isn't persistent. You have to keep reconnecting. Phone makers will have to solve this issue — fast — or be relegated to the voice-only sidelines as wireless PDAs and other devices compete for the market.

The utility of the wireless devices will prove remarkable. Not only will they be conduits to the Web's vast global resources, but they'll also dramatically enhance our connections to our immediate surroundings.

A wireless device that pinpoints your location will be able to answer any questions on services and amenities in the neighborhood. At the first pangs of hunger, for instance, you can ask your device if there are any Thai restaurants within

three blocks. As you drive through a neighborhood that you'd like to move to, you'll be alerted to any houses for sale with the right number of bedrooms and bathrooms. Naturally, the device will tell you how to get to each house. Such location-based services illustrate the new business models that can be enabled by wireless.

These gadgets will be our indispensable copilots as we go about our work and play, and their ability to extract useful information from a barrage of digital data will be key. We'll insist that these devices intimately understand our needs and wants.

In the '70s, backpacking university students bought the *Let's Go Europe* travel books to tell them about the cool places to see in Paris or Rome. In a few years, we may subscribe to a branded wireless service (maybe by a company like The Gap or Coca-Cola) that will tell us the cool things to look for as we go about our lives in New York, Los Angeles and elsewhere.

JOHN GANTZ

Mobile commerce: A mirage? Or a megatrend?

HALF THE DISCUSSIONS at a recent Internet conference focused on the future of mobile e-commerce. This month's *Scientific American* has a cover story about Wireless Application Protocol (WAP) phones and the promise of wireless commerce. At International Data Corp.'s European IT Forum last month, a European Union commissioner talked about mobile Internet access and e-commerce as Europe's bigh-tech salvation.

So, wireless Internet access is hot, hot, bot. I guess our phones will become our credit cards, portable teller machines and Dick Tracy-type communicators, all in one.

JOHN GANTZ is a senior vice president at International Data Corp. in Framingham, Mass. Contact him at jgantz@idc.com.

Well, don't let me rain on anyone's parade, but I bave my doubts that WAP phones alone will turn us all into the Jetsons.

I'm not even talking about the technical issues, which alone might put the brakes on untrammeled mobile commerce, or m-commerce. I'm talking about the fact that even if more cell phones than PCs have the capability of accessing the Net by the end of next year, it doesn't mean you and I will actually *use* that capability.

We have to *want* our phones to call us as we're walking down the street to tell us about a special at the corner Starbucks and download us an e-coupon. We have to *like* the idea that the phone companies are selling data about our location in real time to advertisers. We have to *want* the Internet to blanket our lives.

For m-commerce to become a megatrend, we'll have to see new services that fold in location information, as well as billing, delivery and pickup arrangements all worked out by the companies involved. Let's see, that Starbucks promo will involve a carrier, a retailer, an advertiser, a payment-processing firm, a security or authentication company, a DoubleClick to serve the ad, a Global Positioning System or map information provider and perhaps a cell phone manufacturer. That's a lot of moving parts. I don't have mucb faith that they'll all work in such seamless harmony that the visions being presented by wireless gurus today will really pan out.

But let's say it works. How much is it going to cost? I beard an excellent scenario in Europe from Nicholas Negroponte, who runs the MIT Media Lab, that runs counter to the prevailing wisdom on the Continent that the wireless revolution will lead Europe to leadership in the New Economy. He argues that the European governments auctioned off the wireless spectrum at such a high price that suppliers will have to charge an arm and a leg for service. This will delay adoption of 3G (third-generation, broadband) technology and force extension of 2G (second-generatiun, narrowband) technology to the point that when 3G does come along, it will be too little, too late.

Will m-commerce fizzle? No. But it won't dominate the e-commerce landscape, either.

From an IT professional's point of view, there isn't too much you have to worry about at the data center. But you had better be careful as you walk down the street. As more and more kids use their cell phones to downluad and listen to MP3 files, I expect a lot more pedestrian collisions.

READERS' LETTERS

FCC double standard

THE STORY "TV 'Squatters' Jeopardize Time Line for Wireless" [News, Oct. 16] shows an amazing contrast to the federal government's prosecution of Microsoft. Microsoft, according to the government, cootrols the pace of computer hardware and software evolution through an illegal monopoly of operating systems and applications. Hence, Microsoft also controls the purchasing power of U.S. consumers by constraining their purchases to Microsoft's products. But in reading Bob Brewio's story, I find that the FCC's William Kennard is (in something of a vast understatement) also willing to influence the U.S. consumer's purchasing power, only be's not willing to take the blame.

In blaming the broadcast TV industry for not rapidly consolidating "up" to DTV signals only, Kennard is also blaming it for not forcing all U.S. consumers to either acquire cable or purchase more expensive TV receivers capable of processing the DTV signal. If Microsoft enjoyed as thorough a monopoly as the FCC does, it would simply issue a press release stating that Apple, Sun and Linux could no longer he legally used.

Stephen K. Gartrell
Systems analyst
Columbus, Ohio

Greed doesn't pay

I HAVE BEEN trying to convince business executives and politicians for more than two years that you don't need to understand rocket science to perform many functions in IT ["CIOs: Recruit Trainable Rookies," Page One, Oct. 16]. If you can program in one language, you can learn another. The concepts of relational databases permeate across all of them.

However, executives need to realize they will need some strong leadership, and that means they have to loosen the purse strings. If they are needy, they can't afford to be greedy. They may break the salary and wage structures being established by well-seasoned U.S. IT professionals by bringing in foreigners, but when they try to fix the source code they have paid the cheapest dollar for, it will cost them a hell of a lot more. You get what you pay for — that is a maxim that applies even to greedy CIOs.

Thomas D. Szarewicz
CTDI Inc.
West Chester, Pa.
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H-1Bs hamper industry

DURING MOST of my career, the U.S. government has actively worked against the interest of its technically skilled citizens ["GOP Congressmen Promise Action on H-1B Visas," *Computerworld.com*, Oct. 3]. It bas promoted immigration, subsidized training and offered other incentives to increase the supply (and thus decrease the price) of U.S. technical workers.

The H-1B bailout postpones needed industry reforms in such areas as training professional technical managers; developing and using motivation and leadership skills; saving time with telecommuting and/or distributed offices; using temporary and interim staffing appropriately; reusing code, components and other design elements; applying automated network management tools; and providing continuous technical training and skills upgrading.

Karl B. Keller
Thousand Oaks, Calif.

Starstruck

MY FATHER, a retired professor of chemistry, wanted to move from Microsoft Office to StarOffice ["A Star Shines in the Office," Technology, Oct. 2]. But he immediately ran into compatibility issues. StarOffice totally failed when it tried to import WordArt, Equation Editor and other unique document functions from a Word-based document. It removed his molecular drawings, his equations — even the subscripts and superscripts failed!

I use WordArt and other tools provided by Microsoft Office in my daily work. I can't use StarOffice, nor can I recommend it to colleagues unless I warn them to remain inside the small sandbox needed to create plain word-processing documents. I also tell them StarOffice is not Word-compatible in any large or broad sense.

Nathan Faut
Director, technical operations
Community of Science
Baltimore

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COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

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DAVID MOSCHELLA

Tech industry takes backseat in Gore-Bush race

HAVE YOU noticed that both the high-tech industry and the Internet itself have all but vanished from this year's presidential campaign? Things sure have changed since the heady days of 1996-98, when Silicon Valley was just about stop No. 1 on the fund-raising circuit and chants of "Gore and Doerr" (that's John Doerr of venture capital firm Kleiner Perkins Caufield & Byers) were only partially in jest.

High-tech money is, of course, always welcome, but otherwise, our industry is no longer routinely fawned over. Here are 10 reasons why:

DAVID MOSCHELLA is vice president of knowledge strategy at Meansbusiness, a Boston-based Internet start-up that's building a database of ideas. Contact him at dmoschella@earthlink.net

1. The IT industry used just about all its muscle to ram through Y2k immunity legislation, only to find that it was insurance it didn't really need. After all the hype, the public could only conclude that this was an industry prone to exaggeration.

2. After years of Clinton/Gore warnings about the emerging digital divide, the facts have finally surfaced. Access to PCs has almost nothing to do with an effective K-12 education, and when it comes to those citizens without Internet access, there are still more "want-nots" than "have-nots." Although both Al Gore and George W. Bush talk incessantly about education, technology's role is rarely mentioned.

3. The combination of Microsoft's mixed record on the Internet, along with the boom in handheld, wireless and Linux usage, has taken much of the urgency from the government's antitrust case, which, like the recent Olympics, increasingly seems like yesterday's news.

4. Ever since his fateful statement, "I took the initiative in creating the Internet," Al Gore seems to have felt the need to shun the high-tech industry, lest he unleash yet another round of slightly unfair but still hurtful jokes. (For the record, Gore did show initiative in helping move the Internet from the public to the private sector.)

5. The collapse of many Internet stocks has taken much of the magic out of the so-called New Economy, not to mention the fact that many New Economy leaders are now among the much beleaguered "wealthiest 1% of Americans."

6. By all accounts, the presidential election will be determined in Old Economy places such as Florida, Michigan, Illinois, Ohio and Pennsylvania. High-tech California is considered a lock for the Democrats.

7. For whatever reasons, issues such as Internet security and pornography have temporarily receded, with business-bashing now focused upon Hollywood, HMOs, drug companies and Big Oil.

8. After some initial enthusiasm during the McCain campaign, media and candidate interest in the Web as an important campaign tool have effectively vanished.

9. After eight years of prosperity, the electorate seems to be taking the economy for granted, and thus, the debate has shifted to issues such as Medicare, Social Security, education, the role of the military and that Old Economy standby, the price of oil.

10. Like his father, George W. Bush appears to have no real interest in the Internet and technology industries.

The inevitable conclusion is that utopian visions about how the Internet will help solve all economic and social problems have clearly faded. Indeed, it appears that unless the technology industry either stirs up trouble, is threatened by foreign competitors or is needed to stave off a new recession, it will likely remain in the shadows. From this perspective, keeping a low profile is, perhaps, not such a bad thing after all. ◗

MICHAEL GARTENBERG

Demise of PC greatly exaggerated — for now

IN ONE OF the greatest journalistic blunders, Mark Twain, the great American author, found his name listed on an obituary page. His immortal line of how reports of his death were "greatly exaggerated" has become a standard way of debunking predictions of someone's or something's demise.

MICHAEL GARTENBERG, former vice president and research area director at Gartner Group Inc., is looking for the next generation of Internet technologies. Contact him at michael.gartenberg@gartner.com.

Yet in 1910, Twain's death was no longer an exaggeration, and Samuel Clemens (his real name) did indeed pass away. Today, many lament the passing of the PC as the information device of choice for the corporate workforce. Like Twain, the news of the PC's death is exaggerated, at least for the next five years. But like all good things, the PC and its complex operating system foundation will come to an end.

Here's why the PC, over time, will cease to be the dominant platform of the Information age and what you can do to prepare for the changes ahead.

For years, we've been hearing about the PC's demise. First it was the Internet, then Java, followed by network computers and cell phones. Each has had a turn in the sun as the poster child for the killing of the PC.

But the PC remains alive and well. Vendors still ship systems in record numbers for a simple reason: The PC is the ultimate Swiss Army Knife for information technology. Want the Internet — with rich content, broadband connectivity and the latest in browser technology? You need a PC. Need to access corporate information and to communicate and collaborate with others? That's PC work as well. Entertainment and other noncorporate digital functions? That's also PC territory.

Unless you're willing to live with only a subset of dedicated functionality, you're going to want and need a PC. For office-productivity use, Internet access, entertainment and communication, the PC remains unrivaled in its abilities.

Price, also, hasn't been an issue. With a slowdown in the benefits of Moore's Law, cheap and functional PCs have become a mainstream reality. So what's all the fuss about? Why is there so much hype about the death of the PC?

The answer is that personal computers have historically tracked two paths: enhanced sophistication and functionality, and increased complexity. While users have been empowered by new features, they have also contended with growing complexity that has often obscured the task at hand.

Although PCs have become more complex as they have added levels of functionality, this tradeoff has been better for most users in the short term than reducing the level of sophistication and functionality of the systems. That's one of the reasons that such challenges to the PC like the network computer have failed. But PCs have become far more complex than necessary.

The very complexity of the PC that enables it to handle so many new tasks and functions will ultimately become its downfall. PCs are simply too complex, difficult and expensive for most people to master and maintain.

More important, other devices offer increased functionality and will soon mature to the point where they will cross that magical "it's good enough" line. Devices such as handhelds running Palm Inc.'s operating system and the PlayStation 2 are showing signs of reaching that point in only a few years.

The key to the transition is vendors' ability to balance new technology and features against rising complexity and to cross the threshold of useful functionality. Enterprise users should focus on when new technologies cross this line, so they can deploy the technology that matches their users' skills and needs.

Have you tried to replace a PC with something else? If you have, successfully or not, drop me a line and tell me about it. ◗

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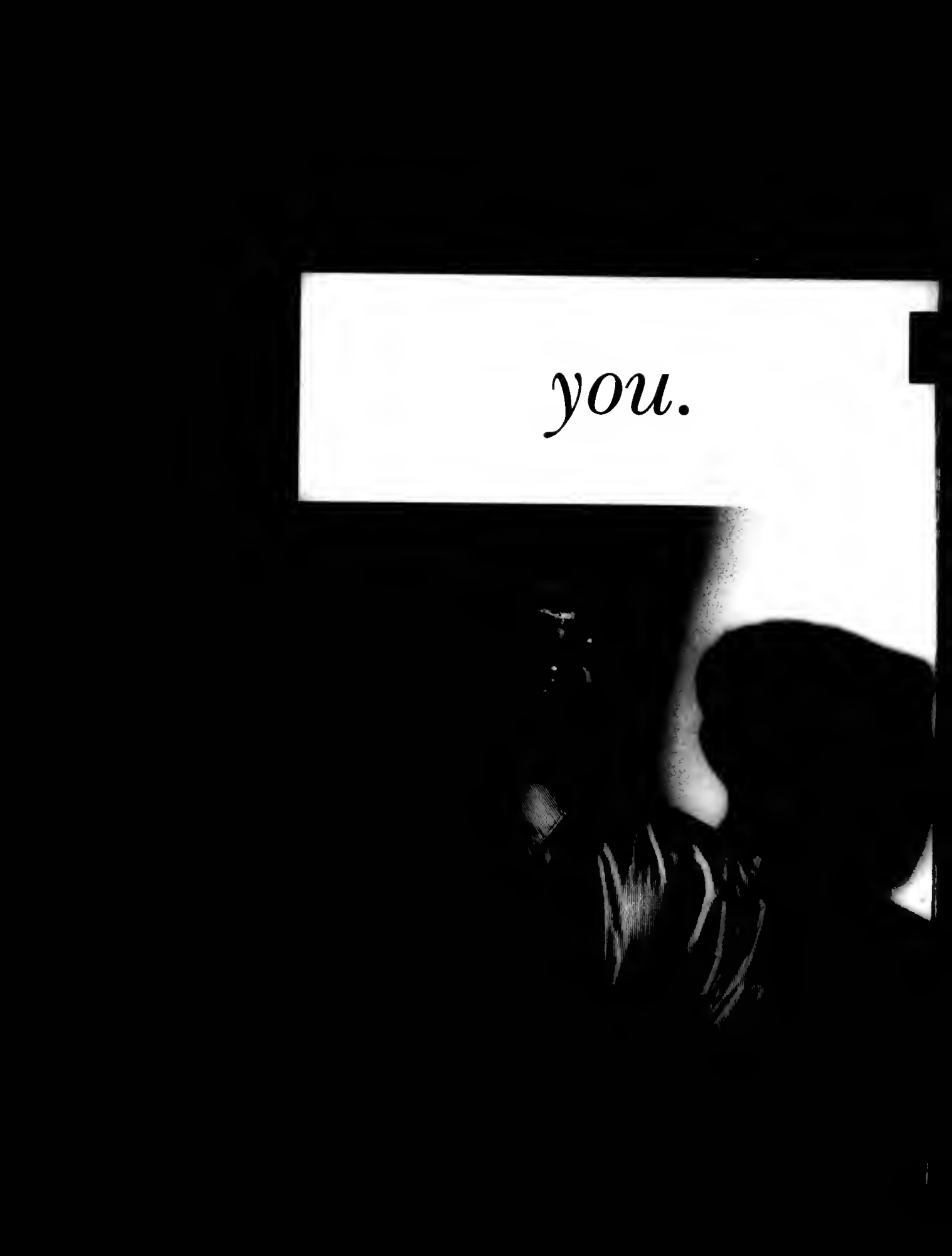
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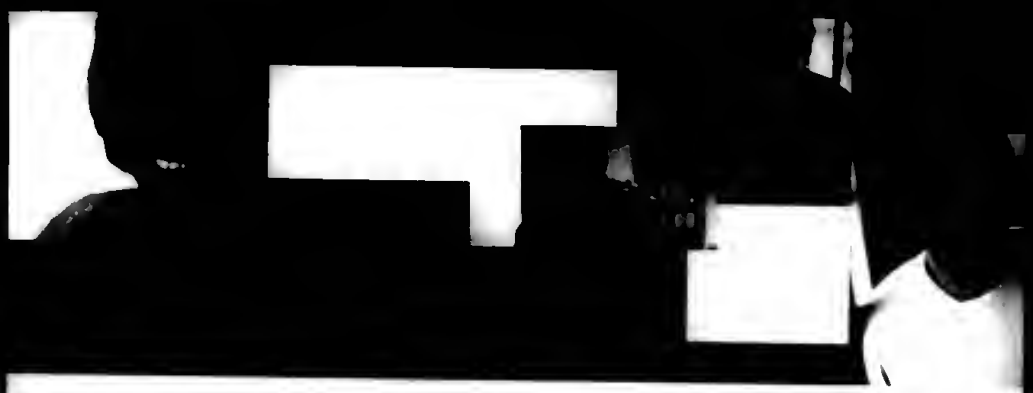

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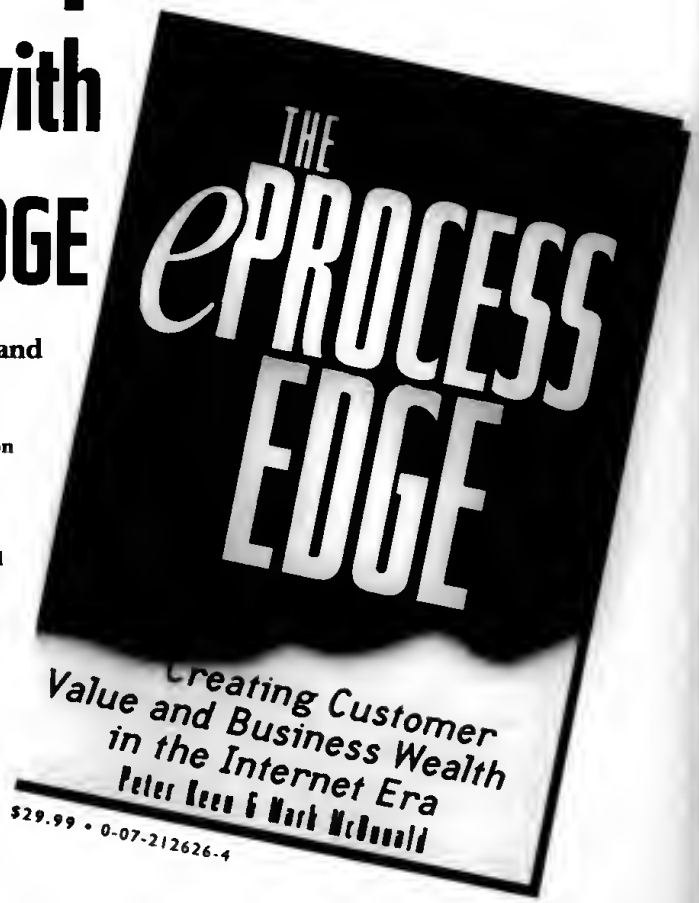

Two thirds of all companies do not understand the gap between technology and process.

Do you? The difference between success and commoditization lies with what happens after the click. Business means relationships, not just transitions. The new race is about profits, operations, and process excellence rather than a mad dash to market capitalization. Keen and McDonald have studied over 80 eCommerce projects and companies and they know how to gain the competitive edge. This book does more than set the scene, it goes into how you make the decisions required to gain an edge.

***Peter Keen** advises leading-edge eCommerce companies. In addition, he has taught at Harvard, MIT, and Stanford Universities. In 1994, he was profiled by Forbes magazine as "the consultant from Paradise."*

***Mark McDonald** is an associate partner and director of Andersen Consulting's Center for Process Excellence.*

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Ellison, Oracle need to rethink new pricing scheme

I HAVE ALWAYS thought that Oracle's prices were way too high, but now they have gone into orbit ["Users Perturbed by Oracle Prices," Page One, Sept. 18].

This power unit pricing scheme is insane. I see no reason why running Oracle software at 800 MHz should cost me more than running it at 200 MHz — it's the *same software*. There are no extra features that you have to purchase to run the software on a faster CPU.

Oracle may have the most popular database on the market, but with pricing schemes like this, that may not last very long. I hope there's enough outcry from the user community to convince Larry & Co. to rethink this ridiculous scheme.

Ron Morton
Database architect/administrator
Union Switch & Signal Inc
Pittsburgh
rdmorton@switch.com

ORACLE HAS been making money hand over fist as Internet start-ups chalked up the initial $500,000 entrance fee to the cost of launching their B2B or B2C businesses.

As soon as Internet businesses start folding and newer ones find it more difficult to raise venture capital, Oracle will no longer be in the driver's seat. There are alternatives out there if you take the time to look for them.

Joel Shandelman
Chief technology officer
Optionable Inc.
New York
Joel.Shandelman@optionable.com

ORACLE IS assuming that every company runs one big database for all its users, but that is not the case ["Oracle Goes on Pricing Defensive," Page One, Oct. 9].

The problem for my company is that now we have to do a very close analysis on the return on investment for each project. Besides, a 1:2 ratio for concurrent to named licenses is ridiculous. By our count, we get at least a 1:10 ratio without the management pain that named users bring.

I'm going to move to Microsoft SQL whenever possible, obtaining the same or better performance at a much lower initial cost and total cost of ownership.

Victor Salicetti
Bethlehem, Pa.

IS TEXAS Petrochemical angry about being asked to pay $200,000 to keep a product we already own? You bet! If it weren't for the fact that my current enterprise resource planning solution doesn't run well under Microsoft SQL Server, we would be a Microsoft SQL shop today.

John Morgan
Manager of IT
Texas Petrochemicals LP
Houston

BUSINESS

TOBACCO WEB WAR

Tobacco company Brown & Williamson has filed a lawsuit against the state of New York, claiming that a soon-to-be-enacted law banning the sale of cigarettes online is unconstitutional. State officials defend the law's constitutionality and say it's a critical public health issue that they will fight to protect. ▸ 40

E-COMMERCE PEACE PLAN

International commerce might just move us closer to world peace, writes Kevin Fogarty. Information technology is the key, he explains, as countries expand international e-commerce partnerships and work to bridge the digital divide. ▸ 40

TRUCKING ALONG

Ryder is offering its customers a new Web-based logistics and supply-chain management service. Analysts say it's a valuable offering because it will give companies a single place to outsource all their logistics and transportation needs. ▸ 41

TRADING UP

Floor traders are destined for extinction, writes Pimm Fox. Each year, electronic-trading platforms raise the bar for stock trading, but CyberCorp's intelligent order-routing capability could be the kiss of death for the open-outcry systems. ▸ 41

SUPPLY-CHAIN FORECAST

It won't be long before companies are at the mercy of their supply chains, predicts former Oracle President Ray Lane. He also says companies like SAP and Oracle will shift primarily to being service providers. Lane's predictions for the future of IT sparked mixed reactions from attendees at Ventro's recent B2B Leadership Forum. ▸ 42

THE LIFE OF A RECRUITER

High-tech skills are at a premium today, and technical recruiter Janice Litvin says she knows what the biggest demands are from employers. In a weeklong work diary, Litvin tells how she goes about matching the right candidates with the right jobs. ▸ 52

COMMERCE ON THE GO

Forget about e-commerce. The challenge now is for businesses to get up to speed with mobile commerce. New wireless tools can save firms time and money and give them capabilities that were formerly impossible because of location constraints. But mobile commerce also introduces issues that companies need to wrestle with to be successful. ▸ 54

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FIDELITY AND SCHWAB FACE OFF

LOOKING TO INVEST ONLINE BUT DON'T KNOW WHERE TO BEGIN? *Computerworld*'s Mathew Schwartz compares two of the top-rated online investment corporations: Fidelity Investments and Charles Schwab. Find out how the companies stack up in terms of leadership, technology, Web sites and customer satisfaction. 46

STELLA JOHNSON

FIDELITY'S STEVE ELTERICH and Schwab's Martha Deevy lead the top two online brokerages; combined, their companies handle online accounts valued at nearly $500 billion

Cigarette Maker Sues New York Over Internet Sales Ban

Analysts say court ruling likely to favor free trade

BY TODD R. WEISS

A New York state law banning sales of cigarettes via the Internet is being challenged in federal court by Brown & Williamson Tobacco Corp.

The nation's third-largest tobacco processor last week filed a suit arguing that the new law unfairly limits the ways in which it can do business. The law is scheduled to go into effect next month and would also bar cigarette sales via mail order and telephone.

The suit, filed in U.S. District Court in Manhattan, asks that the New York law be overturned on the grounds that it is unconstitutional, said Mark Smith, director of public affairs at the Louisville, Ky.-based cigarette company.

"The Constitution prohibits any one state from regulating avenues of commerce, such as the Internet or U.S. mail or interstate shipments," Smith said. The New York law "has implications for all e-commerce."

The state law, signed by New York Gov. George Pataki in August, would ban direct sales of cigarettes over the Internet, telephone or mail in an attempt to prevent minors from making illegal purchases, according to state officials.

Marc Violette, a spokesman for the New York Attorney General's Office, said he believes the new law will be upheld in the courts.

"We firmly believe that the law is constitutional," Violette said. "We will defend the constitutionality of the law vigorously."

Pataki spokesman Joe Conway concurred. "We believe that this is an important public health measure" that will prevent underage smokers from illegally obtaining cigarettes, he said.

Better Visibility

Smith said Brown & Williamson set up a new division called BWT Direct LLC, which plans to offer some of its harder-to-find cigarette brands directly to smokers through the Internet, telephone and mail.

The direct-marketing strategy is aimed at making the brands more visible at a time when retailers have finite shelf space for products such as cigarettes.

"We've got a piece of the business that's kind of fading away if we don't figure out some way of getting these products [out and helping] consumers to be able to find them," Smith said. The brands — which include Tareyton, Carlton, Barclay, Misty and Capri cigarettes — make up approximately 3.5% of the company's annual sales, "which is a nice piece of business," Smith added.

NEW YORK GOV. George Pataki

Brown & Williamson would collect all taxes on the cigarettes it plans to sell directly and forward the money to state and federal governments as required by existing law, according to Smith.

The firm said it plans to prevent sales to minors by using customer databases, voter-registration information and photo identification validation methods to be sure of the identity and age of customers, said Smith.

Harry Wolhandler, an analyst at Peterborough, N.H.-based ActivMedia Research LLC, predicted that the New York law is unlikely to stand up in court as long as Internet, mail or phone sales won't reduce the state's tax revenue.

"I think New York may have a hard time supporting its position, providing all of its other laws are maintained," Wolhandler said.

"I really have difficulty seeing how New York could ban [the Internet] as a channel," he said. "I think free trade is going to prevail on this one."

> We firmly believe that the law is constitutional. We will defend the constitutionality of the law vigorously.
>
> MARK VIOLETTE, SPORESMAN, N.Y. ATTORNEY GENERAL'S OFFICE

KEVIN FOGARTY/BRICKS AND CLICKS

Doing well, doing good

IN HIS BOOK *The Lexus and the Olive Tree: Understanding Globalization*, Thomas L. Friedman argues that international commerce breeds peace.

You wouldn't know it to look at the past few weeks. The West Bank on fire, bombings of a U.S. Navy ship and a British embassy in Yemen, riots in Serbia, unrest in Nigeria, more riots in Indonesia — the bottom just seemed to drop out of peace in a half-dozen places at once.

But that doesn't disprove Friedman's central theme: Countries that do a lot of business together are less likely to go to war than countries that don't. You don't want to attack the country that contains some of your biggest customers. Which suggests that international e-commerce is a relatively easy way to do good *and* do good business.

KEVIN FOGARTY is *Computerworld*'s features editor. Contact him at kevin_fogarty@computerworld.com.

True, a lot of the unrest is coming oot from major hemispheric conflicts, but from nasty domestic or regional situations in which one group is fighting off what it considers oppression by the other side.

It's a haves-vs.-have-nots problem that has no simple solution. But IT can address it — at least in a limited way.

Eliminating the digital divide between those who have access to technology and the skills to use it and those who are trapped in tecboological backwaters is a good way to connect the disadvantaged, roiling masses to the opportunities to the economy via tbe Internet.

Peace through technology may be a pipe dream. But with help from corporate IT and government, it's one that may be achievable.

The Uoited Nations recently launcbed a program to seod volunteers to developing countries to set up PCs, network connections and even phones and to give people access to world markets, healtb informatioo and the rest of the outside world (see *www.unites.org*).

It makes sense for the developing world aod for the corporate world.

People with good economic opportunities are less likely to join rock-throwing mobs. They're less likely to massacre UN aid workers or take foreign IT advisers hostage to satisfy a rage born of frustration.

They're more likely to side witb the peacemakers, to explain to the hotheads that they can do more than just rage at the machine. They can make the machine work for them instead.

People on Indonesia's thousands of islands can connect to one another more easily using cell phones or satellite-linked Internet connections. Palestinians can use distance-learning classes to build programming skills that would earn them jobs in the burgeoning Israeli high-tech industry.

Americao inner-city kids could do the same thing.

In the U.S., that would give corporate IT a wider pool of the technology talent it desperately needs. In the rest of the world, it would give American businesses more stable markets in which to expand.

It's not an abstract coocept, and the UN isn't the only organization that can help. Governments can, too, both national and local — something to remember when you head to the voting bootb in two weeks. And your company's e-commerce strategy can aim to support those up-by-the-bootstrap customers, instead of ignoring them.

The challenge is big, but it's the right thing to do.

And if there really is a connectioo between the Lexus and the olive tree, in the long run, it's the smart thing to do for your business.

PIMM FOX/VOICE FROM THE VALLEY

Floored by technology

I SHOULDN'T BE surprised. Each year brings another new online platform that raises the bar by offering professional firepower to stock market traders. But after seeing a demonstration of CyberCorp Inc.'s CyberTrader trading platform, it's clear that this is where the revolution is going.

And like it or not, the floor broker is going to disappear.

Pimm Fox is Computerworld's West Coast bureau chief. Contact him at pimm_fox@computerworld.com.

Just five years ago, the arsenal of financial information available now would have been unthinkable, except for professional traders with access to high-cost computing.

Now everyone can have the fire hose of information in any color or configuration. Want to display a list of stocks, with charts and pricing information all in real time, along with order-execution capabilities? All you need is a typical desktop PC and a high-speed Internet connection — a lot cheaper than a spot on the floor of the New York Stock Exchange (NYSE).

Better yet, Austin, Texas-based CyberCorp (which was acquired by San Francisco-based The Charles Schwab Corp. for $488 million in February) has something called intelligent order routing.

In order to understand why something like order routing is important, you have to know a little about how a stock actually gets traded. By placing an order to buy or sell, a customer is initiating a series of actions. The first is to determine what the current price of a specific stock might be. The way someone determines price is to access the information from an exchange.

For stocks traded on Nasdaq, the prices of various sellers and buyers of a stock are all listed electronically. CyberCorp takes advantage of its proprietary technology to automatically route an order to the best price.

But on the NYSE, price and trade execution are determined by open bids and offers by exchange members. These members act as agents for institutions and individual investors. The NYSE says buy and sell orders meet directly on the trading floor, and prices are determined by supply and demand.

But electronic exchanges can do the same thing.

By being able to instantly ascertain the best price for a transaction, CyberCorp's technology is onderscoring the debate over whether trading floor specialists who handle a particular stock really offer any value to the transaction.

Sure, when they're representing institutions trying to move $1 million in stock, there's some value to the human touch. But electronic trading is growing more sophisticated by the day, and it's cbeaper.

But is cheaper better?

What is clear is that electronic exchanges are pushing the open-outcry pit aside. Last year, trading volume on Eurex, a 2-year-old electronic exchange, surpassed that of the Chicago exchanges to make Eurex tbe world's most active derivatives exchange.

The future for floor brokers looks set for more gloom. It's a lesson being learned by professionals in just about every industry: If you don't get on board early with technology, you'll be left behind.

But then, that's really no surprise.

Ryder Trucks Onto the Net

BY MARC L. SONGINI

Ryder System Inc., the truck rental and shipping company, is launching a Web-based logistics and supply-chain management service that will let corporations off-load part or all of their transportation and logistics operations.

Through its e-Channel Solutions offering, Ryder will handle inventory management, order processing, warebouse management, transportation and returns operations for customers. The firm launched the service in July and said it has three customers but wouldo't reveal their names.

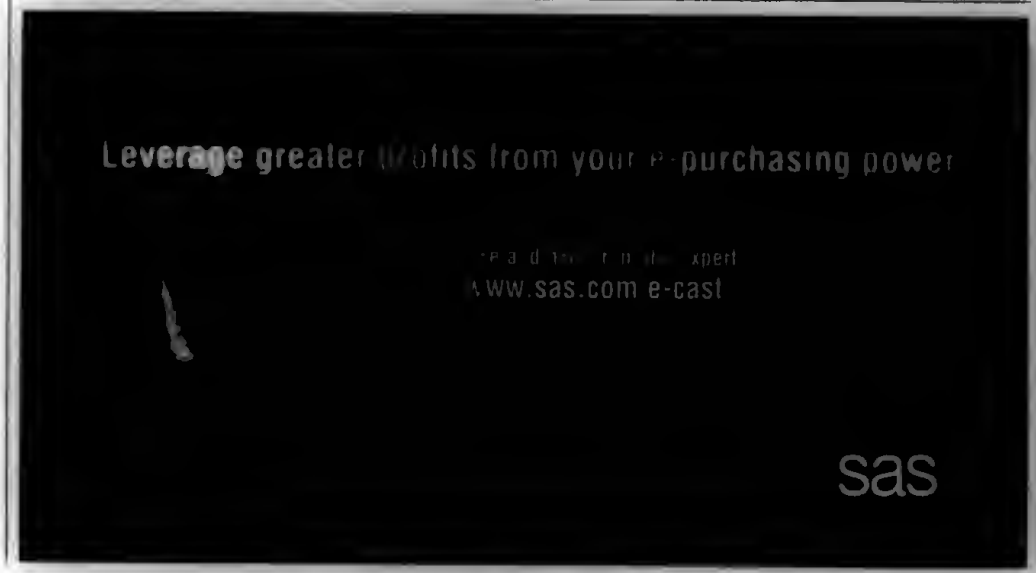
"While other companies offer pieces of a complete logistics and transportatioo service, Ryder is able to give the full breadth of offerings from insurance to process optimization," said Stepheo Brown, senior manager at Toronto-based Deloitte Consulting. "And they are giving customers one contact to deal with, which simplifies their outsourcing."

Typically, transportation and logistics Web sites merely link shippers with carriers, according to Gene Tyndall, executive vice president of global markets and e-commerce at Ryder. What distinguishes Ryder is that it's offering its customers advanced support capabilities "that can change the way they do business," he said. Although it woo't give out any numbers, the company claims that the returns could be significant.

Ryder will offer warehouse space and locate the best possible carrier for inventory, whether it's Ryder or one of its 500 partners. Goods are barcoded, and using electronic data interchange and XML coding to allow transmission over disparate systems, customers can use a browser to locate where their shipments are at any given time, said Sandy Orr, vice president of Ryder's e-commerce solutions division.

Taking the offering further, Ryder will work with its customers to learn how their supply chains work and offer suggestions on how to improve them. It will then establish connections witb the customer's suppliers and clients to ensure that products flow through the system smoothly, said Orr.

The full breadth of visibility of a shipment is key, said Brown. "Sometimes knowing where a piece of inventory is can be as important as the inventory movemeot itself," he said.



Ray Lane: Supply Chain Key to B2B Success

BY MARYFRAN JOHNSON

"Supply chains of the future will 'own' the companies, not vice versa. Companies will be asking themselves: 'What's my role in that supply chain? What do I bring to it?' "

That's the future of electronic business, according to Ray Lane, former president of Oracle Corp. and now a general partner at venture capital firm Kleiner Perkins Caufield & Byers in Menlo Park, Calif.

In a recent speech at Ventro Corp.'s B2B Leadership Forum in Monterey, Calif., Lane also made a startling prediction: By 2005, enterprise resource planning (ERP) application vendors like Oracle and SAP AG "won't exist anymore" in their current form. Instead, he said, they will be supplying services over the Internet — not fussing over the next big release of their packaged applications.

Complexity is what stifles innovation, claimed Lane, who spent years helping run a company whose flagship product is a complex database system. He contended that the internal integration of various business processes during the past 30 years has built up such overly complex systems that radical change is too daunting for many large enterprises.

Lane prescribes that users accept the deeply ingrained complexity and concentrate on finding suppliers, outsourcers and other partners that can help them innovate. "Manage your brand, manage your core competency, but leave the rest to partners," he said.

Lane's blunt assessment of the decline of traditional business models — and the rising need to integrate with Internet-enabled supply chains — was a welcome counterpoint to "all the confusion around B2B," said Susan McKay, vice president of customer and information systems at Aircast Inc., a medical products manufacturer in Summit, N.J.

THE ASSOCIATED PRESS

RAY LANE: Complexity is what stifles innovation

Aircast takes part in the Salt Lake City-based Promedix specialty medical product marketplace that was set up by Ventro, a Mountain View, Calif.-based developer of business-to-business exchanges. About 40% of Aircast's business is already conducted via electronic data interchange links, McKay said. But the big growth potential is online, she added.

Not everyone agreed with Lane, however. "I disagree totally that we're all going to end up working company-to-company and doing business [directly] with everybody," said Timothy Grossnickle, manager of supply-chain services at Akzo Nobel Inc. in Chicago. "Maybe [Lane] thinks we can all link our ERP systems together, but who can afford [to devote] all that time building all those links?"

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WORKSTYLES

What It's Like to Work at . . . Phillips Petroleum Co.

Interviewee: Kay Sallee, corporate information technology services manager
Company: Phillips Petroleum Co *(www.phillips66.com)*
Main location: Bartlesville, Okla.
Number of IT employees: 400 in Bartlesville, plus 196 dispersed across oil refineries, rigs and other business units
Number of employees (end users): 2,450 in Bartlesville, 12,110 worldwide
What is Bartlesville like? "It's a very family-oriented town, and we have a very high percentage of Ph.D.'s in the area."
Major IT initiatives: E-commerce (business-to-business and business-to-consumer), expanding the intranet, knowledge management, a Windows 2000 migration and, next year, an upgrade of the company's SAP AG enterprise resource planning system
What's unique about working in IT in your industry? "We have a lot of emphasis on the use of technology to help us improve exploration and production processes – seismic data collection and analysis, geophysics, geographic information systems, drilling information systems. There's a lot of number crunching; it's calculation-intensive. And we have a unique user base – lots of engineers and a big research and development community that is exploring alternate fuel technologies."
What impact have rising oil prices had on IT? "None, really. We have a very clear direction and operating plan, and that hasn't been impacted by the price of oil."
How is working in corporate IT different from working in the various units? "We have to work harder here in Bartlesville to keep our focus on the business because we're not on a rig or in a refinery."
What kind of work does IT do in a refinery? "Process-control work, lab information management systems, interface with real-time data collection from the instruments and data analysis."
IT training: A combination of in-house and off-site training in Windows 2000 network and systems administration, interpersonal communication, knowledge management, Web-related technologies and SAP
IT career-path options: "We have various job models. Most of my staff are 'business-solutions providers.' We don't have a very well-documented, regimented progression plan, but we like to move people through the different business units, both internal and external to IT."
Employee reviews: An annual, formal process via the intranet, including performance reviews and goal-setting
Bonus programs: "We have corporate recognition programs but no IT-specific bonuses. There's a cash award program where employees can receive a spot bonus of up to three months' pay for performance that's above and beyond. And we have an annual merit program where a portion of your compensation is based on corporate performance, group performance and individual performance."
Workday: "It's a nine- to 10-hour day. Most people arrive between 7 and 8 a.m. and leave between 5 and 7 p.m. We also have flextime."
Dress code: Casual
Must people carry beepers? Cell phones? "Yes, about 40% of the corporate IT staff does."
Percentage of staff that telecommutes: "A couple of people in my group work from home one day a week. We always try to be flexible based on people's individual needs."
On-site amenities: "A very nice recreation complex downtown for employees, retirees and their families. It has a gym, a bowling alley, a swimming pool and a recreation staff to coordinate activities like volleyball leagues, basketball games and programs for kids like gymnastics and swimming. Employees [who want access] pay a small fee that's deducted from their paychecks."
Little perks: IT parties and recognition rewards. "Our CIO really believes in celebrating successes and recognizing people's contributions."

– Leslie Goff (lgoff@vnunet.com)

JIM CHAMPY

No rushing the Net

THE WORLD DOESN'T MOVE at Internet speed — at least not yet. That's an important point to keep in mind, especially for companies building business-to-business digital marketplaces and for managers trying to get people to work with a new technology or application.

The Internet can certainly speed up such functions as product searches and order fulfillment, but we don't know how to accelerate behavioral change or technology adoption.

I learned that lesson many years ago, when some partners and I saw the opportunity to develop a networked word processing system. It was before the old Wang Laboratories had even entered the market and 20 years before Microsoft Word was around. We wanted to automate document preparation and distribution, especially for producers of large documents, like law firms and defense contractors.

The gain for the customers? They could throw out all those clanking typewriters and install one central shared system that would zap briefs and reports around the office.

So we borrowed a million dollars from a bank — that was venture capital in those days — and cobbled together processors from Data General and desktop terminals from Tektronix. We spent several hundred thousand dollars to develop the first generation of word processing software and rushed to market with our brilliant invention.

We were met with mostly blank stares. Office managers, the clients for such products in those days, couldn't fathom spending $100,000 to buy our system. All they had ever bought were IBM typewriters for about $1,000 each. And they couldn't see the benefit of what we had built — at least not by spending $100,000. After selling three of these systems, we sold off our surplus hardware and, fortunately, were able to pay off our debt from other sources of income. We didn't have the capital to persist and develop a market. Shortly thereafter, Wang did.

Corporate behavior takes a lot of time to change.

The slow pace of technology adoption is difficult for optimistic technologists to adjust to. Look around your own company and industry. Electronic data interchange is a recent example of a good technology that has taken many years to be adopted, and even today, business transactions are still heavily paper-laden.

Two factors may obscure the truth. First, the hype around the Internet suggests that, somehow, the workplace will quickly become both paperless and wireless. Some organizations — most likely start-ups — no doubt will. But large companies are still slow to change.

We can also be fooled by how quickly large numbers of people have moved to using e-mail, shopping on the Internet or surfing the Web for information. Wireless telecommunications technologies have also moved swiftly into Europe and Asia. But these are examples of individuals, not organizations, who are adopting new ways. And in many instances, wireless technologies aren't replacing any existing infrastructure.

When you install a new system in a company that affects how work gets done, or if you want to change the way a company operates through an Internet-based service — like a business-to-business marketplace or an application service provider — remember that you're dealing with corporate behavior. That takes time to change. No matter how compelling your business plan, companies will likely be slow to adopt your technology or processes.

But here are two suggestions that might help:

First, keep the new processes that your technology enables as clear as possible. Pursue simplicity over complexity.

Second, because adopting new technology and processes takes time, make sure you have the resources to persist. For start-ups in business-to-business companies, that means money. Many business-to-business start-ups will fail, not because they don't have a good idea, but because they won't have the resources — and maybe the fortitude — to persevere. It just might take some time for customers and suppliers to warm up to new technology.

Champy is chairman of consulting at Perot Systems Corp. in Cambridge, Mass. He can be reached at JimChampy@ps.net.

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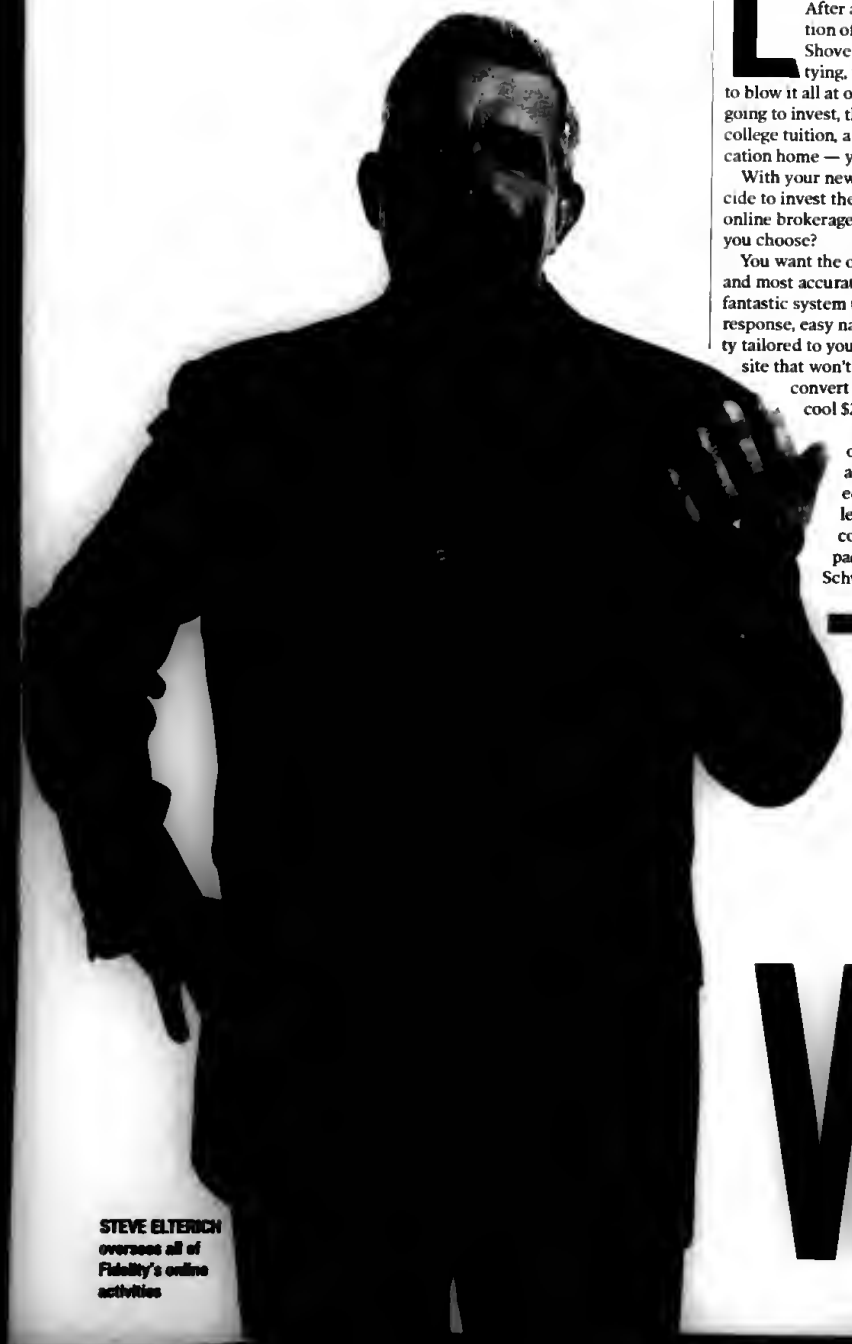
Fidelity and Schwab: Two major duke it out online. Who has th



STEVE ELTERICH oversees all of Fidelity's online activities

LET'S SAY YOU wake up $2 million richer tomorrow. After a spectacular rendition of "Take This Job and Shove It" and a night of partying, you're determined not to blow it all at once. Instead, you're going to invest, then pay for the kids' college tuition, a Porsche, an island vacation home — you want it all.

With your new spare time, you decide to invest the money through an online brokerage, but which one do you choose?

You want the one with the fastest and most accurate trades, a record of fantastic system uptime and customer response, easy navigation and usability tailored to your needs —in short, a site that won't inhibit your ability to convert that $2 million into a cool $20 million or more.

Two recent surveys of the online brokerage industry conducted by market research leaders show that the companies leading the pack are Charles Schwab Inc. and Fidelity Investments. In one survey, Lincoln, Mass.-based Gomez Advisors Inc. ranked Schwab the top online brokerage for the second straight quarter. In the other, Agoura Hills, Calif.-based J. D. Power and Associates gave the nod to Fidelity.

While the firms' origins and management styles couldn't be more different, they have both managed to stave off a bevy of online brokerage houses that are trying to entice customers with a wide range of incentives, from dirt-cheap trading commissions to all-access research. These upstarts are willing to do anything to undercut the two giants' commission prices and to try to outmarket them.

"Fidelity and Schwab are . . . much more driven by service and delivery of information and education, and that's what makes them leaders in the industry," says Nancy Salk, J. D. Power's director of research.

So where should you invest?

To figure that out, we looked at four key competitive areas for the two firms: leadership, core technology, Web site ease of use and customer satisfaction.

Battli Web In

players in the investment world e edge? By Mathew Schwartz

Who's in Charge of Your Money?

The differences start at the top. Fidelity's chairman and CEO, Edward C. Johnson III, is the son of the founder; his daughter Abigail, who owns about 25% of the company, is a senior vice president. The company was founded in 1946 to handle mutual funds. Fidelity — notoriously private and privately held — tends to promote from within.

Last year, Fidelity's net income was just over $1 billion; it reportedly spent more than $1.5 billion on information technology — though not all on its online operations. Highlighting the importance of courting and retaining customers to maintain its profit margins, Fidelity has a state-of-the-art usability lab, which includes sophisticated gaze-tracking technology to see where users are looking on a Web page.

But Boston-based Fidelity is mucb more than just an online brokerage, and it's struggling to bridge its multiple lines of business into what customers are asking for: an aggregated view of all their accounts online.

In contrast, Charles R. Schwab founded his discount brokerage in 1986. By 1997, it had joined the ranks of the top online brokerages. Today Schwab manages a staggering 42% of all online assets — handling more than twice the volume of its nearest competitor. Last year, the company had net income of $588.9 million. It's also one of the top sellers of mutual funds — including Fidelity's.

Mr. Schwab has always been characterized as a very hands-off guy, and he has a reputation for reinventing the company as ofteo as necessary. Recently, that meant acquiring CyberCorp Inc. in Austin, Texas, for its cutting-edge order-routing technology, and New York-based U.S. Trust Corp. for its high net-worth individuals.

Like Fidelity, San Francisco-based Schwab relies heavily on its real-world branches, wbere more than 70% of new Schwab accounts are opened.

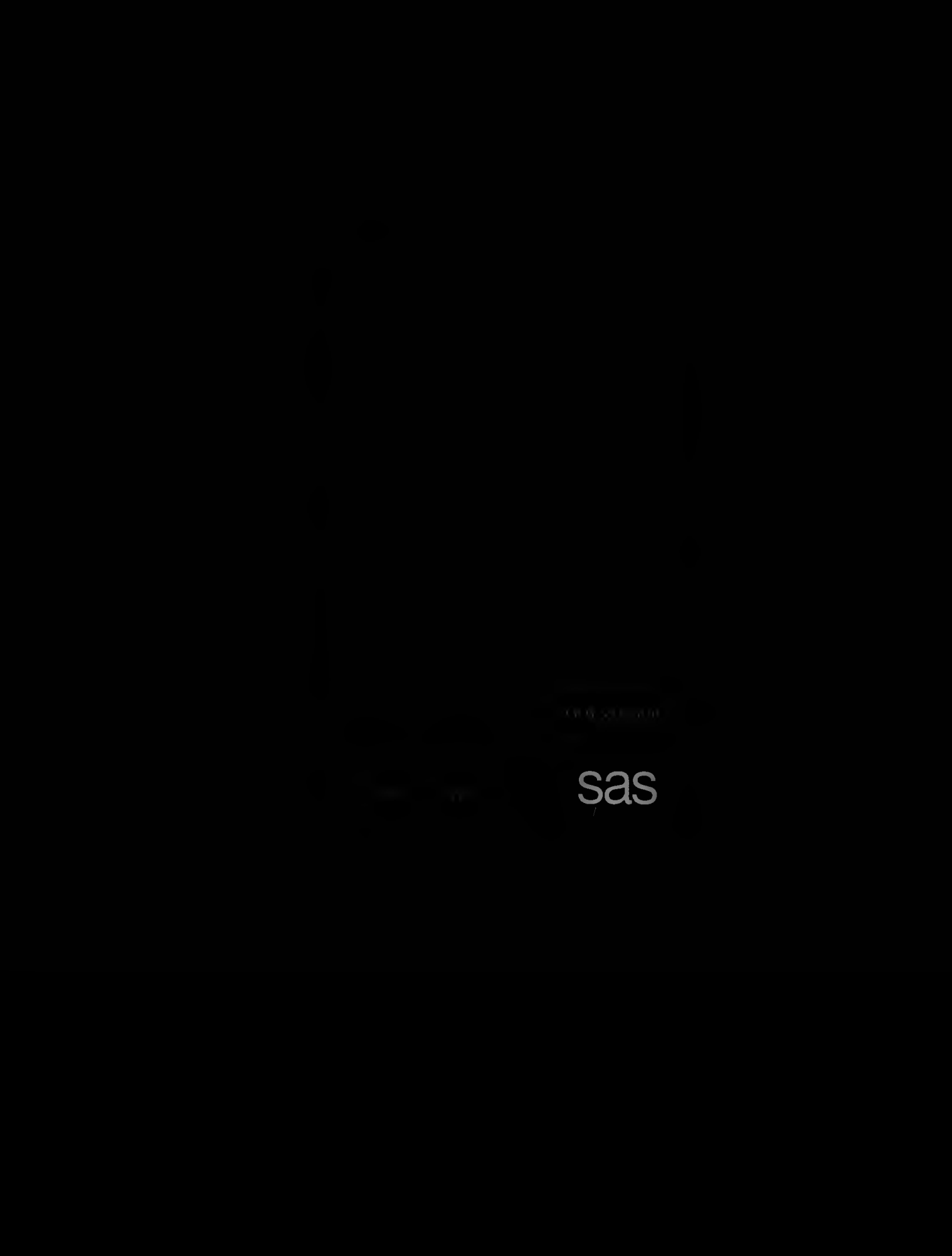
So which CEO is most effective at enabling his company to respood quickly to changing market conditions? Last year, Fidelity consolidated responsibility for all of its online services into one position, filled by Steve Elterich, president of Fidelity's electronic business, who reports directly

Continued on *page 50*

MARTHA DEEVY: Schwab's Web presence should be 'graceful hand-offs'

ng for vestors

Of all the places where you can
improve your company,
this is the most important one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Continued from page 47

to the chief operating officer. Since Fidelity is, in essence, a number of different companies set up to manage investment vehicles such as 401(k), 403(b) and brokerage and mutual fund accounts, Elterich's position reveals clearly how Fidelity views the Web from an organizational standpoint: as one unit.

Advantage: None. Let's face it, these two companies are performing incredibly well. While Schwab tries to get ahead on the Web by any means necessary — including acquisitions — you can't fault either firm.

Technology

The first two things an online trader needs to know: Will the Web site be live anytime I need it, and how quickly will trades be executed?

Here, no brokerage firm's shirt is clean. In their rush to court more investors, most brokerages haven't been able to keep up in times of peak usage, such as when the stock market declined in the spring. "As a whole, the industry did not fare well in what we would call the industry's first stress-test in March and April," says Salk.

During that time, the more brokerages grew, the slower their sites ran. As a result, customer satisfactioo dropped, though Salk says Fidelity's customer satisfaction ratings dropped less than would have been expected, based on its growth.

Each new investor represeots new revenue potential for hrokerages — hut only if that investor keeps a lot of money in his accounts or trades frequently. Regardless, having more investors requires brokerages to beef up their server and computing power. And while massive mainframes power the Fidelity and Schwab sites, there are still scalahility bottleneecks, especially with the middleware that marries legacy systems with Internet front-ends.

Schwab, in particular, is trying to solve real-time order handling and scalahility issues other sites can only dream of. That's because it runs the world's largest e-commerce site, handling an average of 293,318 trades per day in the second quarter of this year. Schwab is followed by Menlo Park, Calif.-based ETrade Group Inc. (with 214,573 trades per day), New York-based T. D. Waterhouse Group Inc. (182,336) and Fidelity (156,583).

But last year, Fidelity spent far more on its technology needs than did any competitor. While not all of that $1.5 billion was directed at its online brokerage, Fidelity does have economies of scale. For example, as its engineers discover ways of making its 401(k) servers move faster, those discoveries can often he applied to brokerage, mutual fund and other departments, improving overall site performance.

Schwab vs. Fidelity in 1999

	NUMBER OF DISCOUNT BROKERAGE ACCOUNTS	VALUE OF DISCOUNT BROKERAGE ACCOUNTS (IN BILLIONS)	NUMBER OF ONLINE DISCOUNT BROKERAGE ACCOUNTS	VALUE OF ONLINE DISCOUNT BROKERAGE ACCOUNTS (IN BILLIONS)
Schwab	6,600,000	$725	3,300,000	$349
Fidelity	5,341,106	$346 6	2 426 200	$145 6

That's one benefit of being very big.

It seems to be paying off. "For the much more technical aspects in our study, Fidelity comes out as the winner," says Salk. "Some of their standout points are execution time and response time."

"If [Fidelity] wants to do something, they do it themselves," notes Jason Lind, an analyst at U.S. Bancorp Piper Jaffray Inc. in San Francisco. "They might not be first to market, might not make the flashiest press releases in the beginning, but [they] have a tried-and-true product in which they're confident, and I think that shows."

Nowhere is this more evident than in Fidelity's wireless services, which far outpace those of all other hrokerage firms, says Lind.

Schwab has taken a similar home-grown approach. "More than 90% of the transactional side of our software developmeot is done in-house," says Vincent Phillips, Schwab's senior vice president of electronic brokerage. But when Schwab wants to get new functionality much faster, it's willing to do whatever it takes to get there.

In a move earlier this year that defied analysts' expectations, Schwab bought the day-trading firm CyberCorp, gaining intelligent order-routing software. The software can comb the Nasdaq Stock Market and electronic communications oetworks to find the best stock price to execute a trade. The move bolstered Schwab, whose $30-per-trade fees are more than double those of its competitors, in the lucrative day-trading market. Lind adds that Schwab is two years ahead of its competitors with order-routing technology. But just as with Fidelity's wireless services, consumers aren't yet crying out for order-routing, Lind notes.

Advantage: Fidelity, whose unparalleled $500 million annual research and development hudget could give it a long-term site uptime edge.

Tale of the Tape

Schwab

Headquarters: **San Francisco**
Employees (1999): **18,100**
1-year employee growth: **36.1%**
1999 sales (in millions): **$4,713.20**
Sales growth over 1998: **39.1%**
1999 net income (in millions): **$588.9**
Net income growth over 1998: **69%**

Fidelity

Headquarters: **Boston**
Employees (1999): **30,000**
1-year employee growth: **7.1%**
1999 sales (in millions): **$8,845**
Sales growth over 1998: **30.5%**
1999 net income (in millions): **$1,008**
Net income growth over 1998: **126.1%**

SOURCES: COMPANIES, REPORTS

Site Navigation and Ease of Use

One place to start building an online brokerage is with novice users, and both firms have unveiled significant educational resources, interactive life-goal planners and "sandboxes" — places where people can test things out and see the consequences of their actions before jumping into the real thing. But users need to be able to find such features.

Here, Schwab's site takes the edge. J. D. Power's Salk says Schwab's "ease of navigation through its site" gives it strong marks. "Schwab does very well in the actual online tools, like online portfolin monitoring and management," she says. "Fidelity had obvious site navigation problems that they have taken great strides in improving."

Fidelity has a greater hreadth of offerings on its site than Schwab. An individual who has an online brokerage account with Fidelity might also have a corporate 401(k) or mutual funds.

Here's the rub: The more features that are uffered, the harder it is to use a site, says Shalin Patel, a research analyst at Gomez Advisors. "Fidelity has a lot of information on their site, and I think going forward, they basically need to integrate their whole offering to make it more streamlined for the consumer to use," he says. "At Schwab, on the other hand, navigation and usability is easier, for the most part."

While acknowledging that Fidelity's navigation isn't ideal, Elterich says that "in the fall, we will he coming out with a new navigational approach" that will eschew the e-commerce metaphor of using tabs currently in vogue at sites such as Amazon.com and instead will use something more innovative.

Fidelity's usability lab, the Fidelity Center for Applications Technology, is a powerhouse and includes cutting-edge technology previously found only in military or university settings, such as the ability to track where people's eyes are looking. Though that technology has its quirks (by some accounts, it doesn't even work on 30% of the population), Elterich contends that such a feature allows Fidelity to put its site design through the ringer. "Are we providing capabilities that are valuable, and are they well designed?" he asks.

Guarding its throne, Schwab says it's continuing to streamline its navigation. Its ultimate goal is a user interface that automatically adjusts its presentation based on which types of accounts — IRA, brokerage, custodial — customers have. So if a customer has five custodial accounts, a brokerage account and an IRA, the site will he able to preseot all of that information in one interface and provide users with suggested tools (such as debt reduction or retirement planning) in an easy-to-use fashion.

Advantage: Schwab, though Fidelity is working overtime to close the gap.

Customer Satisfaction

He who courts the customer wins — and there are many to court. In the past six months, there's been a 22% increase in the number of households coming online, according to J. D. Power. And during that same period of time, the percentage of households registered at more than one brokerage has increased from 17% to 38%.

Both Fidelity and Schwab are trying to strike a balance between their on-line and off-line businesses. "The challenge for us on the Web is creating graceful hand-offs," acknowledges Martha Deevy, a senior vice president who runs Schwab.com.

But when it comes to handling customers' problems, "Fidelity has a definite strength," says Salk. Fidelity milks every possible customer interaction for Web information. "When someone calls in on the phone, our phone representatives encourage people to provide feedback on the Web, if they're using the Web," says Elterich.

Schwab pays special attention to customer requests too. Sometimes a user even gets directly connected to upper management, which maintains contact with him, even soliciting feedback if and when the feature goes live.

Schwab and Fidelity, which have solidified their off-line reputations through excellent overall customer service, are tough to separate here.

"Measuring customer satisfaction is really dicey," says Lind. Of the various studies that purport to do so, "who's last in one is ranked first in another."

Advantage: Schwab. In the future, ongoing customer satisfaction will have much to do with getting nsers into and out of the site as quickly as possible. While Schwab's no-frills interface has the edge there now, the bigger Fidelity is hustling to catch np. ■

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DIARY OF A TECHNICAL RECRUITER

What skills are most in demand in today's job market? What impresses a hiring manager most about potential employees? To find out, we asked technical recruiter Janice Litvin to detail a typical week spent trying to place skilled job candidates and fill difficult job requisitions.

Monday

No sooner do I get to the office than I find I have 84 e-mails already waiting for me. I always hate to start the week this way, but, hey, job orders are the bread and butter. So I spend the first hour of the week sorting through them. There are no surprises in this group. The available positions range from a Cobol programmer with DB2 and CICS experience, a network manager with LAN/WAN and applications software experience, and a business analyst and Web developer with Oracle, Enterprise JavaBeans and Unified Modeling Language knowledge.

I search my database and the Internet for Cobol programmers and business analysts. After an hour or two of downloading résumés, I decide to go back and read them more closely. I'm not looking forward to reading piles of résumés today — candidates are getting way too many offers, so I know my clients will want to have a lot of job candidates to choose from. It's taking a larger pool of candidates to fill every position. The killer part is seeking out people who have the unarticulated requirements clients are looking for, like assertiveness and leadership.

Tuesday

I call all my potential matches today. Many have heard from other recruiters, so I have to convince them to give me 10 minutes of their busy day to listen to my pitch and tell me about themselves. This requires that I come up with a quick way to grab their attention. Brainstorm! I tell them something I don't think they hear every day: "How would you like to have fun at work, dress casually and

have access to full refrigerators while advancing your career with hot technology, promotability and lots of training opportunities, earning big bucks and stock?" That grabs their attention — for the moment.

I talk to a total of 24 candidates today. Sometimes I feel so frustrated. I really take a genuine interest in each candidate, but there's no way I have enough time to give to each of them. So if they aren't suitable for one of my immediate needs, honesty is the best policy, and I tell them I will keep their résumés in my database for the future.

One of the candidates today seems qualified on the surface, but I find that he isn't really doing that much programming anymore. I have to really probe to find out how qualified he is for the Cobol, DB2 and CICS opening and why he wants it.

Then there's the nice guy who responded to the network manager job. He tells me why he's so great, but unfortunately, his greatness has no relevance to the job I need to fill. He turns out to be a disaster-recovery expert earning more than $90,000. I have to give this guy credit; his enthusiasm is contagious. But I can't really help him right now. He insists that he can learn anything thrown at him. I listen politely and try to explain that network managers get eaten alive if they can't adequately support their staff as well as their business partners.

With another candidate, the old salary red flag goes up. His salary expectations seem way too high for his experience level. I have to gently probe this one on his salary history, trying not to step on his sensibility toes. Commuting also repeatedly comes up as an issue with him.

I finish my prescreening and send bios to my client employers along with the résumés.

Wednesday

It's already the middle of the week, and I haven't done any cold calling yet. Ahhhh! It never gets any easier.

After I check my job order log, return phone calls and follow up on résumés sent the day before, I push myself to jump into . . . recruiting.

> **Being a recruiter is no easy job. . . . But it all pays off when I meet new people and help with their careers.**
>
> JANICE LITVIN, TECHNICAL RECRUITER, MICRO SEARCH SF

Alas, the really good prospective employers are getting several calls from recruiters every week. So when I call, the first thing they usually ask me is, "Why should I work with you?" or "Are you on our list of preferred vendors?" I finally connect with one prospect and actually get an appointment.

Then I spend the afternoon prepping candidates for upcoming interviews. I always enlighten them about some of the personal qualities of the managers they'll be meeting, and I discuss some of the tough questions they can expect:

- What did you like most/least about your previous employer?
- With what type of manager do you do your best work?
- What are your biggest weaknesses?
- Describe a difficult situation and how you resolved it.
- If you're looking for a job, you must be unhappy at your current job — what's wrong?
- Why should we hire you?

It's a long day at the office, but I don't want to miss an opportunity to meet new people face-to-face. So I go to an association meeting.

There are several association meetings I could attend each month: the Association for Computing Machinery, the Association for Women in Computing and any dot-com networking meetings. As usual, I arrive early to "work the room" — scout for new clients and candidates.

I meet an interesting woman who's a hiring manager at a software company. She says she has lots of openings for software developers. Of course, she expects them to already know technology that has just been on the market for a few months. I ask her to meet with me next week. I want to discuss her job descriptions and get to know her better. That will give me a shot at working on her expectations. I suggest that she consider training senior developers in new technologies.

It seems like managers keep forgetting what a tight job market it is. They really need to get the message that training, developing and building is the best way to overcome skills gaps and retain engineers.

Another manager tells me about one of his openings. Whoa! He wants too many divergent skill sets. He says he's looking for a business analyst who can walk on water while rowing and fishing.

Thursday

I check my hot sheet and do my follow-up calls. Then I prepare proposals for the prospects I met last night.

Some of the hiring managers I met were very savvy. I'd enjoy recruiting for them. I sense I could genuinely sell their opportunities based just on the strength of the managers alone. I am always impressed by someone who mentors his employees, doesn't micromanage and uses positive reinforcement.

On the other hand, one of the managers thinks he's going to attract talent just because his company is a dot-com. Apparently, he hasn't gotten the word that the market is slowing down.

I have fun visiting two clients' companies where I've recently made placements. One technical writer wants to meet me for coffee to discuss some minor misunderstandings he's having with his boss. He says he can't understand why his boss has been "short" with him lately and asks me to act as a go-between to help work out some communication difficulties.

Some interviews are scheduled for today, and I'm awaiting every debriefing call with a bit of anticipation. I told my candidates that I need to hear from them right away so I can head off any concerns that may arise.

One of my candidates is concerned about long-term opportunities. He says he doesn't want just maintenance programming; he wants new development. He really wants to move to Web work as soon as possible. He's been preparing on his own by taking classes, reading books and handling free projects for small businesses. I suggest that he be willing to take on the assignments at hand and then discuss a plan with his boss for making a transition into Web-related activities. If he passes the first interview round, we'll schedule another, more thorough round.

Friday

The most exciting thing happens today — an offer comes in! Offers are always thrilling.

What a way to end the week. This turns out to be a 15% raise for my candidate. He'll even get to work with the Web. After elaborating on some outstanding benefits questions, the candidate decides to accept the offer. He's going to give his notice on Monday.

This is a match made in heaven. I ask him for referrals of anyone with similar skills. After that, I just want to shut down my computer.

Placing a candidate was a great way to end the week. Being a recruiter is no easy job, even in the best of markets. But it all pays off when I meet new people and help with their careers.

I have to admit that my biggest rewards still come when I get a card from a satisfied candidate thanking me for my help in finding him an exciting and challenging job. I feel double that pride when I get a card from someone I placed who has stayed at the same company for several years. ◗

Litvin is a technical recruiter at Micro Search SF in Walnut Creek, Calif. Contact her at jlitvin@microsearchsf.com.

Mobile Commerce

BY BOB BREWIN

GARY WILLIS, a truck fleet manager at Rochester, N.Y.-based Agrilink Foods Inc., can't do much to hold down the spiraling cost of fuel, which this year has soared to its highest level in the U.S. since the Persian Gulf War.

But thanks to a mobile refueling system offered by Agrilink's diesel supplier, Grenley-Stewart Resources Inc. in Tacoma, Wash., Willis can quickly monitor his fuel expenses and shave those costs by cutting down on the amount of time drivers spend waiting to fill up at commercial fueling stations. That's because Grenley-Stewart fills trucks at night with its mobile fuel trucks, which use wireless systems the company developed.

Trucks that are fueled by Grenley-Stewart are equipped with radio-frequency "smart tags" that authorize fuel delivery and serve as the key to an integrated billing system, explains Nathan Wright, marketing director at IDmicro Inc., a Grenley-Stewart spin-off company in Tacoma.

When a Grenley-Stewart fuel truck pulls into a customer's yard, the driver unrolls a hose, puts a fuel nozzle into a customer's truck tank and then passes a handheld wand over the smart tag, which then transmits an authorization code to a handheld wireless computer carried by the driver.

The computer, in turn, sends a signal to the fuel truck's pump to start the refueling operation, saving the driver from walking back and forth to manually start the fueling operation. "This frees up a lot of driver time for us," says Willis, who calculates the time savings at 30 to 45 minutes per truck each day for his 12-truck fleet.

After the refueling is completed, Wright says, an IDmicro computer totals the gallons delivered and the cost. Because each truck is tagged, the system can compute the amount of fuel used since the last time the tank was filled up, making it easy for customers like Agrilink to calculate their cost per gallon.

"This helps us track our costs, with a central billing record that provides us with fuel detail on each vehicle," such as the quantity delivered, the cost per gallon and the miles per gallon, says Willis.

DEFINITION

Mobile commerce is the use of radio-based wireless devices such as cell phones and personal digital assistants to conduct business-to-business and business-to-consumer transactions over wired, Web-based e-commerce systems.

Channel Expansion

Grenley-Stewart's mobile refueling system is a niche application and certainly not the kind of mass-market mobile-commerce service that's being touted by most wireless wannabes. Still, it illustrates how wireless applications can automate processes that in the past proved difficult due to geographic constraints and the nature of the process itself, according to Wright.

In the business-to-consumer arena, FTD.com kicked off its wireless flower-ordering service last Mother's Day in an attempt to keep pace with consumer buying patterns, according to Mike Soenen, president of the Downers Grove, Ill.-based company. Soenen says FTD.com's early entry into wireless parallels its move to the Internet. "We know our customers will move into different mediums. That's why we went onto the Web in 1994 and [into] wireless this year."

FTD.com has signed agreements that give it key screen positions on wireless Web networks operated by natinnal carriers such as Kansas City, Mo.-based Sprint PCS Group and Redmond, Wash.-based AT&T Wireless Group.

Although Soenen declines to provide details on the scale of orders the company has received from mobile users and the revenue it has generated from its wireless Web operations, he says FTD.com is "doing better than we expected." Soenen also won't speculate about the future reveoue potential of mobile commerce because he says he doesn't "know anyone who knows the future of m-commerce."

Indeed, the economic realities of mobile commerce need to be placed in the context of the relatively small size of all e-commerce transactions globally compared with the value of all goods and services sold internationally, says Antesh Barua, an associate professor of information systems at the University of Texas at Austin.

Last year, worldwide e-commerce amounted to $800 billion, compared with $36 trillion in goods and services sold around the world. And the share of that $800 billion in e-commerce that mobile commerce represented was so small, it was almost immeasurable, Barua adds.

Paul LaFontaine, vice president of the mobile division at TicketMaster Online-Citysearch Inc. in Pasadena, Calif., which kicked off its wireless service in May and now offers tickets to events in 33 cities nationwide, also won't discuss sales or revenue except to say, "Given the early phase of wireless development, sales are meeting our expectations."

Volume is low, LaFontaine says, because the number of users with data phones in the U.S. is low. "The traffic numbers are not there because only a small number of people have devices right now, about a million nationwide. M-commerce has been overhyped."

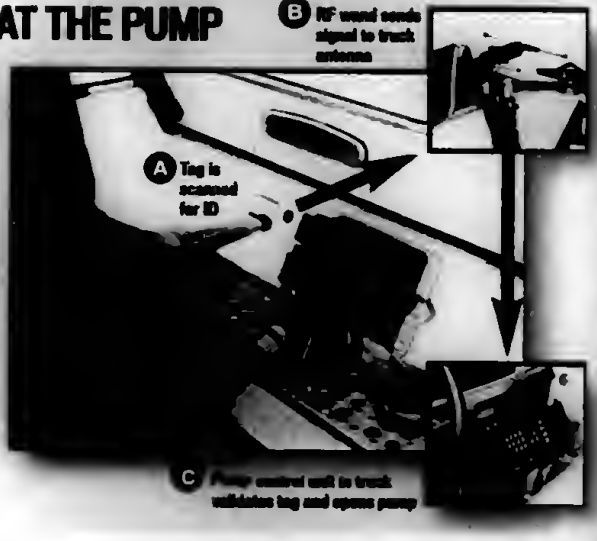
But as traffic increases, LaFontaine says TicketMaster is well-positioned to take advantage of that growth because it has a nationwide inventory of theater, movie and music-event tickets that dovetails well with the "short-term planning" of mobile users. He adds that not all Web opportunities can be translated onto the wireless Web. For example, "you are probably not going to use your Web phone to buy a car," LaFontaine says.

Ken Dulaney, an analyst at Gartner Group Inc. in Stamford, Conn., agrees with LaFontaine that mobile commerce has been overhyped and won't be an established business for another three to five years. Dulaney blames the lag time on incompatible standards, lack of nationwide reach and hard-to-use phones.

Companies that want to succeed in mobile commerce also need to stop trying to stuff the wideband and big-screen functionality of wired Web sites onto narrow-bandwidth, small-screen wireless devices, Dulaney says. "A good wireless Web application will require me to use only one finger on one screen," Dulaney says.

PREPAID AT THE PUMP

The IDmicro-developed refueling system (right) is an example of a mobile-commerce application at work. As the number of data cell phone users increases – currently there are only 1 million data phones out of a total of 90 million cell phones – a flood of niche and mass-market applications will be introduced, according to analysts. Widespread mobile-commerce application use is expected within three to five years.



■ *Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.*

WHAT

DOES THE

NBA MVP

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LEFT HAVE

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WITH THE

IT VP

ON

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Dear Career Adviser:

In my opinion, your answers give the impression that a 22-year-old, fresh out of school, has much more to contribute than someone with 15 to 25 years of solid experience. Repeating the mantra that the older, more experienced worker has less to offer than the young recent graduate creates a problem where none existed.

Too many employers may think a thing is true just because they see it in print; they don't realize that it's one story restated numerous times. Let's face it, the real issue is finding the cheapest labor source possible.

— IN MY OPINION

Dear Opinion:

Not at all. My specific mantra concerns the ability to constantly *recycle* your skills and attitude no matter what your age or level of experience is.

If you have up-to-date technical skills; an open attitude; a willingness to work 55 to 60 hours per week; a propensity for banging out code and fixing bugs at home on days, nights and weekends; and a zest for learning new packages, playing Foosball and thinking passionately about your work from your cubicle perch, this job market doesn't care about your age. In fact, it will pay full freight to buy your talent and loyalty every six months if necessary.

In a job market where dot-com start-ups are incubated within Fortune 500 campuses, and companies named John Smith and Dad replace those named John Smith and Son, the bottom line is whether you can contribute real value in a fast-moving and fickle business environment. If you can produce results, you're of value. If not, you fall by the wayside — fast.

Dear Career Adviser:

I've been a military officer recruiter in the U.S. Navy for the past eight years. I've recruited information technology professionals, but now I would like to leave the Navy and work as a senior contract recruiter in Silicon Valley.

Can you provide solid advice about how I can make this transition?

— BRAVO ZULU

Dear Zulu:

Plan to relearn everything the Navy has taught you about recruiting, because where you're coming from coincides little, if at all, with where you want to go, particularly if you want to jump ship right into a senior recruiting role at a Silicon Valley company.

FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

First, you'll need to walk the walk and talk the talk of the companies, business plans and products you'll be representing. Then, you'll have to proactively find and hire exactly these kinds of candidates.

When you interview to work in the Highway 101 trenches, you may be asked the following questions: Are you able to drive candidates to your Web site and to your company's job fair booth or recruitment events? How? Do you know companies that are in trouble that have talent your company needs? Can you create a speedy set of interview processes and profiles of candidates so managers will know when to give you the go-ahead in pursuing a potential hire? When interviewing candidates, can you explain your company's stock option plan, vesting and benefit plans, who your competition is and where your company fits in the market?

To get a better understanding of the intricate proactive skills you'll need, attend a job fair in San Jose or Santa Clara, Calif., or talk to the recruiter members of the Human Resources Consultants Association in Silicon Valley (*www.hrca.com*). You will probably need eight months to a year of recruitment apprenticeship before you can hold your own.

Dear Career Adviser:

I am a CPA and I want to extend my career toward IT without putting my accounting career totally in the cooler. I want to know what jobs are open to me that would combine my accounting and financial expertise with technology. And what technology do I need to have under my belt to get one of these jobs?

—CPA SAP

Dear SAP:

Even without additional training, you could increase your IT skills by volunteering for IT-related accounting projects and by designing reports, mapping new accounts and assisting with user testing, says Linda Carlton, president of Alameda, Calif.-based FinanceStaff. In fact, CPAs are highly valued contributors to IT projects because they can set and manage time lines, understand business processes and the flow of business information and have a good grasp of how data actually flows.

But if you're serious about combining your finance background with IT on a more formal basis, take courses either on the Web or at a school to learn the financial modules of products from prominent vendors, including Oracle Corp., Hyperion Solutions Corp. and SAP AG.

It will take about a year of study and hands-on experience before you can jump into the deep water. But you'll be able to sell your skills at rates of $150 per bour either by working directly for a vendor or consulting to clients. Your CPA and knowledge of a specific financial package are what's required, but you need not become a programmer. ▶

BRIEFS

Publisher Names CIO

HarperCollins Publishers Inc. has appointed as its CIO Richard Schwartz, who formerly held the same position at Young & Rubicam Inc., a New York-based advertising firm. Schwartz, who will oversee all of New York-based HarperCollins' IT efforts, brings more than 25 years of technology experience to the job.

AT&T Offers Wireless Messaging

Citing the wild popularity of two-way wireless messaging in Europe, AT&T Corp. last week began offering the service in the U.S. It offers wireless messaging on several Nokia Corp. phones and Motorola Inc.'s V-Dot phone for $5 per month.

Amazon Hires SAS

Amazon.com Inc. has signed a five-year contract for software and services from Cary, N.C.-based SAS Institute Inc. The Seattle-based online retailer plans to use SAS e-Intelligence to streamline internal operations and improve relations with customers and suppliers.

Online Car Dealer Adds Five Lenders

CarsDirect.com Inc. last week announced that it's adding five new lenders to its Web-based vehicle brokerage service. The Culver City, Calif.-based start-up, which began offering financing from Chicago-based Bank One Corp. last year, said that by the end of this year it will add financing from AmeriCredit Corp., The Chase Manhattan Corp., General Electric Capital Corp., Union Bank of California and WFS Financial Inc. Customers will be able to complete applications and get rates and approval online.

Lieberman Says IT Should Police Itself

The technology industry should be allowed to continue to set its own policies related to online privacy, with government taking a limited role and holding off on taxing Internet commerce for the next two to five years, U.S. Democratic vice presidential candidate Joe Lieberman said last week at Gartner Group Inc.'s Symposium/ITxpo in Orlando. Lieberman said he's committed to creating a federal CIO position and to greater investment in the New Economy. Despite his own co-sponsorship of legislation to create a moratorium on Internet taxation, he conceded that "It's not a question of if; it's a question of when" such taxes are introduced.

SNAPSHOT

CEOs Take Responsibility

Who is responsible for keeping the CEO informed on technology?

CEO is responsible	26%
CIO is responsible	4%
CEO and CIO share responsibility	70%

- Half of CEOs say they have a high comfort level with IT; 6% say they aren't comfortable with IT
- More than half of CIOs report to the CEO, but one-third still report to the CFO
- 58% of CEOs say they are only "somewhat capable" of evaluating their CIOs

SOURCE: KENNEDY-KENNEDY PARTNERS, RESTON, VA. BASE: SURVEY OF 53 CEOs

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TECHNOLOGY

HEARING VOICES VIA THE WEB

Yahoo and Lycos use voice-recognition technology to let customers hear information from the Internet through their telephones. The technology is also being used by major corporations in their customer call centers, and in the financial services industry, customers can even buy and sell stock using only a telephone and their voices. ▸ 60

WARILY EYEING EXCHANGE 2000

With the release of Exchange Server 2000, users are facing not one upgrade but two — the new messaging system also requires Windows 2000's Active Directory. Users at the recent Microsoft Exchange Conference in Dallas found plenty of reasons to upgrade but disagreed on how to get there. ▸ 61

SECURITY JOURNAL

Security manager Jude Thaddeus takes time out to attend an off-site vendor training session, and — surprise! — actually comes away with information he can use. But is it worth all that time out of the office? After four long days, he decides that in-house product training actually would have been a better idea. ▸ 62

HANDS ON

Reviews editor Russell Kay looks at three pocket PCs. One has a good, though not stand-out, design, but some elements compromise its general usefulness. Another, although full of promise, is nearly unusable for some people, in its current incarnation. And the third is a genius-class design — clever, attractive, reliable and functional, all at once. ▸ 64

FUTURE WATCH

Direct digital X-ray systems spell the end of film and having to wait for diagnostic images. Once they're taken, the X rays can be viewed simultaneously by any number of people in sites scattered across the globe. The only problem: The transition from analog to digital systems is a budget buster for hospitals. ▸ 65

MAKING THE MIGRATION

Now that Windows 2000 appears to be gaining momentum among the Windows NT faithful, Microsoft's nascent operating system is getting a hard look from another constituency: NetWare users. Know the benefits and trade-offs first, advise IT managers who have made the migration. ▸ 66

QUICKSTUDY

InfiniBand is a standard describing a new architecture and specifications for data flow between processors and intelligent I/O devices. Learn more in *Computerworld*'s primer. ▸ 72

MORE

Emerging Companies 73
Skills Scope 74

EXCLUSIVE B2B EXCHANGES

PRIVATE BUSINESS-TO-BUSINESS exchanges promise to improve communication with suppliers, reduce inventory costs and boost quality. But IT organizations planning such exchanges must define their goals early and watch out for creeping implementation costs, experts say. And with the field still in its infancy, vendors are jostling for position, changing their claims almost weekly and often promising more than they can deliver.

70

BRIEFS

IBM Launches WebSphere

IBM has released the WebSphere Everyplace Suite. WebSphere is middleware that can help companies deliver content to a variety of devices over both wireless and wired networks, according to the company. Pricing starts at $50,000.

Wireless Server Supports Exchange

Wireless Knowledge Inc. in San Diego has announced that its Worksyle Server now supports Microsoft Corp.'s Exchange 2000 Server. The application will make it possible for an enterprise to securely extend real-time wireless access to Exchange 2000- and Exchange 5.5-based corporate e-mail, calendar and contact information from wireless phones and handhelds as well as land-line connections, according to Wireless Knowledge.

VA Linux Upgrades Cluster Manager

VA Linux Systems Inc. has released the newest version of its VA Cluster Manager (VACM) software package, with enhanced remote monitoring and management of large server clusters. VACM 2.0 is designed as a flexible open-source tool to help monitor clusters of hundreds of servers each, according to the Fremont, Calif.-based company.

Tarantella Rolls Out Enterprise 3 Software

Tarantella Inc., a subsidiary of The Santa Cruz Operation Inc. in Santa Cruz, Calif., has unveiled Tarantella Enterprise 3, the latest version of its Web-enabling software package.

The reworked suite, to be released Oct. 30, supports four times as many concurrent users as the previous version – up to 1,000 users per server – with as many as 50 servers being combined into a single array. It also features numerous other improvements in scalability and support, according to Tarantella. Pricing information wasn't available.

Lycos, Yahoo Launch Web Voice Services

Free services provide access via phone to a host of online information

BY LINDA ROSENCRANCE

Want to know what the weather forecast is for Juneau, Alaska, get the latest information about the race for the presidency or buy 100 shares of stock, even though you're not close to your PC?

Now you can just pick up your telephone, dial the appropriate number and ask.

Earlier this month, Lycos Inc. in Waltham, Mass., unveiled its new voice portal to allow telephone users in five U.S. cities, including Boston and San Francisco, to dial an access number and then speak commands into their telephones to obtain information like news and weather from Lycos' network of Web sites, free of charge.

And Yahoo Inc. in Santa Clara, Calif., has launched a free service that allows users to have their e-mail read to them or hear personalized My Yahoo content such as stock quotes, weather forecasts and sports scores over the phone.

However, Yahoo's voice portal isn't currently voice-activated; users have to use a telephone keypad to select the information they want.

Lycos and Yahoo declined to discuss their investments in the services, but they're not advertising-free. Consumers must listen to four- to eight-second advertisements before they can access information.

Voice access to information on Web sites may be the latest trend in the consumer space, but the technology is already widespread in the corporate sector. Voice-activation software is used in myriad industries — particularly travel and package delivery — to give customers access to information stored in back-end databases.

Firms like FedEx Corp. in Memphis, National Railroad Passenger Corp. (Amtrak) in Washington and ETrade Group Inc. in Menlo Park, Calif., are using voice-recognition technology powered by software from SpeechWorks International Inc. in Boston to give customers voice access to a variety of information.

Other companies, such as IBM, also make voice- or speech-recognition software.

FedEx customers can get shipping rates, track their packages and find drop-off locations just by asking over the phone, said a FedEx spokeswoman. Eventually, customers will also be able to schedule package pickups, she noted.

ETrade allows its customers to buy and sell stock anytime, anywhere over the telephone, using voice technology, said SpeechWorks spokeswoman Leah Lesser. About 65,000 of ETrade's 450,000 daily trades are made by customers using the company's voice services, Lesser said.

Amtrak uses speech-recognition technology to enable customers to call the reservations line and ask what time a train will arrive at or depart.

"By the time the speech recognition system is fully implemented in the next three years, customers will be able to make reservations using just their voices and a telephone," said Amtrak spokeswoman Karina VanVeen. The technology will help Amtrak cut costs in its customer-care center because customers won't need a live person to get routine questions answered, she said.

However, analysts disagreed about how widespread consumers' use of voice portals will be in future.

According to an ongoing survey being conducted by The Kelsey Group in Princeton, N.J., by 2005, 45 million users of wireless phones in North America will regularly use voice portals to perform everyday chores like getting news, and half those users will be hard-core voice shoppers.

"When pigs fly," scoffed John Dalton, an analyst at Forrester Research Inc. in Cambridge, Mass. "No person on this planet will [shop] using voice-enabled applications. Try listening to information in a minivan with a bunch of screaming kids and a barking dog.... Forget about it."

Active Voice

Industry uses for voice-recognition technology

Banking: Pay bills, transfer funds, get account updates

Financial services: Buy and sell stock, check account balances, get stock quotes

Health care: Get the names of health-care providers in a specific area

Retail: Check e-mail or access information from the Internet such as sports scores, news and weather

Mercury Interactive Polishes Topaz Web-Monitoring Suite

Version 3.0 aims to pinpoint problems

BY SAMI LAIB

The latest version of Mercury Interactive Corp.'s Web performance-monitoring suite, Topaz 3.0, should let users more quickly pinpoint problems, according to company officials.

Pinpointing is key for Topaz 3.0 beta tester WebEx Communications Inc., said Manoj Garg, CIO at San Jose-based WebEx, which provides virtual meeting rooms that let users make presentations online.

"We have real-time communications [placing demands] on our infrastructure all the time," Garg said. "We looked at other products, but they couldn't provide the specificity needed."

Most of the changes to the product suite are incremental, said Corey Ferengul, an analyst at Meta Group Inc. in Stamford, Conn. Topaz 3.0 may appeal to users with very focused troubleshooting needs, he said.

WebEx has more detailed demands than other companies may have, a WebEx spokeswoman said. "Creating a global, distributed real-time network is quite difficult," she said. After testing Topaz 3.0 for about three months, Garg said, WebEx has decided to buy it.

Sharper Tools

The suite does offer some new tools, such as Prism, which monitors requests made to a Web server. Prism is based on diagnostic technology from Conduct Software Technologies Inc., which Mercury acquired last year.

The Conduct technology lets Prism track a transaction from end to end, unlike conventional trace-route analysis, which is stopped by firewalls, said Zohair Gilad, vice president of product marketing at Mercury in Sunnyvale, Calif.

Topaz 3.0 also adds the ability to collect Web and application server data for Allaire Corp., Ariba Inc., BEA Systems Inc., Blue Martini Software Inc., BroadVision Inc. and IBM WebSphere servers.

Other tools in the Topaz suite let a manager monitor load balancers, routers and other network devices, according to Gilad.

The suite is "a very good product," Ferengul said, but he also noted that heavyweights such as Hewlett-Packard Co. and Houston-based BMC Software Inc., as well as smaller companies like Boulder, Colo.-based Freshwater Software Inc., offer similar products.

Topaz 3.0 is available by subscription, and begins at $2,495 per month. Prism alone starts at $2,995 per month.

Users Weigh Exchange Features vs. Migration Hassles

Exchange 2000 involves complex implementation

BY ROBERT L. MITCHELL

The attendees of the recent Microsoft Exchange Conference in Dallas had plenty of features to consider with the release of Exchange Server 2000.

The latest version of Exchange, which shipped Oct. 9, includes new collaboration functions like instant messaging, shared desktops and online chat; server clustering support; and the ability to break the Exchange information store into smaller, more manageable databases. It also jettisons the Exchange directory to take advantage of Windows 2000's Active Directory.

Attendees generally reacted positively — perhaps not surprising, since most represented the "Exchangerati," veteran users of Microsoft Exchange.

But while many users said they were at least considering an upgrade, some attendees expressed concerns about the scope and timing of an upgrade, which requires Windows 2000 Server and hefty Active Directory planning.

Users who have avoided bringing Windows 2000 server into their organizations now face some tough choices.

"Messaging servers are important," said Dan Kuznetsky, an analyst at Framingham, Mass.-based International Data Corp. "Organizations don't touch them until they have to." But he said he sees Exchange Server 2000 as one of the first services to give users a reason to upgrade to Windows 2000 Server.

But that doesn't mean it's going to be easy. "It's going to be a pain. We don't plan to go to Exchange 2000 right away," said John Wolfe, a systems analyst at Entergy Corp., a New Orleans-based utility company that recently agreed to merge with FPL Group Inc., parent of Juno Beach, Fla.-based Florida Power and Light Co.

Backup, Server Consolidation Concerns

Other users cited several reasons for planning a migration sooner rather than later. "Our primary reason to migrate is going to be decentralized administration. Active Directory lets us go out and delegate [Exchange Server 2000] administration rights, which is very good," said Wolfe.

Wolfe and others said the ability to break up the Exchange information store into smaller, more manageable chunks is a factor, too.

"My information store is 13GB. It's taking me 16 hours to back up . . . so you don't get a clean backup," Wolfe said, adding that neither his backup software nor his fax server software are Exchange 2000-compliant yet.

John Crouch, a personal communications manager at Dallas-based Baylor Health Care System, said that while he shares these backup concerns, server consolidation is motivating him to put an Exchange 2000 migration on the fast track. Baylor currently has a 30GB database and 12 Exchange 5.5 servers supporting 5,000 users. Using new clustering support, "we hope to reduce that by two-thirds," Crouch said.

Exchange Server 2000 requires companies to define Exchange users in an Active Directory structure, which means migrating at least the Exchange servers to Windows 2000 Server.

Users were split on whether they should fully deploy Active Directory and Windows 2000 first — a major undertaking in itself — or simply do the minimum necessary to get Exchange 2000 running.

> "It's going to be a pain. We don't plan to go to Exchange 2000 right away."
>
> JOHN WOLFE, SYSTEMS ANALYST, ENTERGY CORP.

Stan Sorensen, a group product manager for server applications at Microsoft Corp., said a partial implementation and building of the Active Directory is an acceptable strategy.

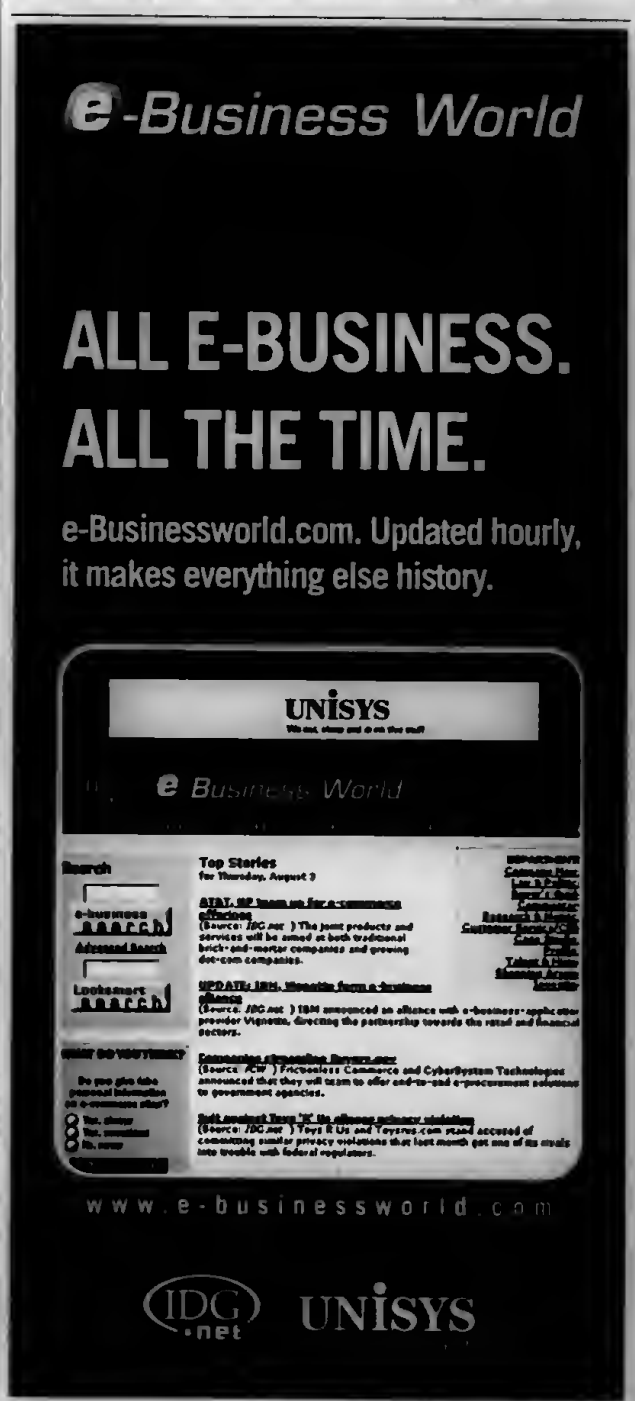
However, Vicki Fredrick, information technology director at Strasbourg, France-based Aventis, a Microsoft joint-development partner, has been through the process and said she has a different view. "There's no choice. If you're going to migrate, you have to have a fully populated Active Directory," she said.

Crouch said he will create an Active Directory for all 5,000 users. "We should be finished deploying [Active Directory] by the end of the month," he said, but added that he will hold off upgrading all of his NT servers.

"We're only migrating the [Primary Domain Controller] and [Backup Domain Controller]. In remote offices, we'll install a Windows 2000 domain controller along with the NT 4 domain controllers and run in parallel," Crouch said. "We have so many application servers that it's difficult to upgrade them [due to applications' lack of Windows 2000 support]. We're going to a mixed-mode environment," he added.

The much-promoted collaborative features of Exchange Server 2000 drew interest, but only a few attendees cited specific implementation plans.

"We'll use all the features. That's one of the reasons why we were able to keep Notes out," said Wolfe. "We're an Exchange organization, and we didn't need another variable in there."



Off-site Product Training Gets Panned

After four long days, Jude ultimately decides in-house training would have been a better idea

A STROKE OF LUCK Whoever set up the PCs in the training room in which I spent four days forgot to remove the games from Windows. A combination of FreeCell, Minesweeper and Solitaire helped get me through the dull bits of the course.

Information technology courses are often a bit dull because the material is so dry, but that mostly wasn't the case with this one. I trained for several days on Internet Scanner and System Scanner from Internet Security Systems Inc. (ISS) in Atlanta, and the products appear to be extremely good and very interesting.

Security Manager's Journal

Both products are technical-vulnerability scanners — or what I call "gurus in a box." Run either of the products on your local environment, and they'll give you a detailed list of all the security vulnerabilities on that box, along with instructions on how to close those vulnerabilities.

This will be exceptionally useful to me. I don't have any spare staff to conduct detailed technical reviews of servers and network segments. Now, instead of having to buy more human technical expertise, I can just point and click and get a clear, concise and reliable report of all the problems.

One Slick Scanner

Internet Scanner will give me visibility of all network security issues on TCP/IP segments, and System Scanner will tell me all I need to know about Windows NT and Unix servers. Between the two of them, they'll cover about 95% of our environment, leaving out only a few legacy Macintoshes, IBM AS/400s and so on.

Even better, ISS has a department called the X-Force that continually updates these scanners in much the same way antivirus companies update antivirus scanners.

Internet Scanner is so slick and simple that you can tell ISS has been through many iterations of the product, refining it at every step. If I want to scan a network segment, I install the software on a laptop, patch the laptop into that network segment, select one of the predefined scanner policies and hit "Go." It's really that simple.

These predefined scanner policies tell the scanner what to look for, and ISS supplies five incremental policies that should satisfy most requirements.

The first policy just maps the network segment and tells you what operating systems are running on each network entity. The second policy gives you more details about the services each host is running, and the third finds glaring holes that even an amateur could get through.

The fourth finds holes that automated hacking tools could get through, and the fifth finds all possible vulnerabilities on the network segments.

In fact, when I ran Policy 5 on the classroom network, it quickly showed the bidden firewall that (presumably) separated that subnet from the rest of the building, and it even suggested a few ways of breaking through it.

These five main policies make it easy to build up security on a network one piece at a time, rather than swamping you with information right from the start. Alternatively, you can use strong policies to protect public-facing network segments and weaker policies to protect low-risk internal segments. All the functionality is there to modify or create your own policies to match your environment.

In fact, it's hard to find anything to complain about with the product. It does support only one database format for storing the results of seans (Microsoft Access 97), but that's a trivial issue. Maybe I'll find more problems with it when I start using it in our production environment.

System Scanner is quite different from Internet Scanner. It's designed to scan servers for detailed operating system vulnerabilities. One way of looking at the difference between the two scanners is that Internet Scanner shows you how hackers might break into your network, while System Scanner shows you what they could do once they have broken in — or even what insiders could do if they put their minds to it.

Digging Deeper

System Scanner operates at a much deeper level than Internet Scanner and is a younger and more complicated product — and it shows. The two days we spent on that product were plagued by crashes, application errors and strange inconsistencies in results that frequently stumped our otherwise knowledgeable trainer — and that was on a simple, controlled training network.

Although the technical-vulnerability scanning appears to have all the features you could need, the ancillary functions are somewhat lacking. Of course, the vulnerability scanning is the most important function, so you could say that as long as that works, then everything's fine.

However, the ancillary functions are what make a product usable and effective in the long run, and that's where System Scanner fails. The graphical user interface is poorly designed, in stark contrast to that of Internet Scanner.

The client/server/console architecture is poor; the server and console are combined into one application, making it very difficult to scale up implementations for large corporate environments. ISS issues regular product updates — a combination of application patches and scanner updates to look for new vulnerabilities — but the application has no means of checking which updates you've installed on which agent. (ISS says Version 4.1 can check the update level for each component.)

There's a feature to mark reported vulnerabilities as known "exceptions" — which is equivalent to saying, "I know about that vulnerability, and there's nothing I can do about it at the moment, so stop reporting it" — but there's no way to review or amend exceptions once they've been set. (ISS disputes this, but our trainer acknowledged that it can be unreliable.)

These are only examples — there are plenty of small problems like them, problems that individually are no more than irritations but that, en masse, build up to make the product look unprofessional and difficult to manage. That's a pity, because it will be very useful indeed, and I can see that we'll use it extensively.

That said, given the professional job ISS has done on Internet Scanner, I'm sure it will bring System Scanner up to par in the next couple of releases.

So, given that the products are so interesting, why was the training course so dull? Well, as in many application training courses, the instructors seem to have tried to expand the content to fill the available space. A cynic might say that was to justify charging more for the privilege of attending.

I spent four days training on two applications, and I feel the instructors could have probably covered the same material in one day if they'd pushed a bit.

I'm not going to let any of this put me off from using the applications, but next time, I'll skip the training and hire a consultant for a day or two to go through it with us on-site. ◗

THIS WEEK'S LINKS

www.iss.net/securing_e-business/security_products/security_assessment/index.php: This page on ISS's Web site includes information about the company's SafeSuite scanning software, which is a software bundle that includes both the Internet Scanner and System Scanner products.

Readers of previous columns will recall that I'm also evaluating a new version of our encryption software. For new security managers who need some background on encryption technology, here are a few links I have found helpful:

http://theory.lcs.mit.edu/~rivest/crypto-security.html: Ron Rivest's page of cryptography links is an excellent resource.

http://cwis.kub.nl/~frw/people/koops/bertjaap.htm: Bert-Jaap Koops' page of cryptography links includes a particularly useful survey of cryptography law worldwide.

www.counterpane.com/: San Jose-based Counterpane Internet Security Inc.'s Web site is the online home of Bruce Schneier, author of *Applied Cryptography* (John Wiley & Sons, 1996), the best crypto textbook published, in my opinion.

■ This journal is written by a real security manager, whose name and employer have been disguised for obvious reasons. It's posted weekly at *www.computerworld.com* to help you and our security manager – let's call him Jude Thaddeus – better solve security problems. Contact Jude at jude.t@lycos.com or click on *Computerworld.com*'s Security Watch community forum to participate in discussion topics.

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Pocket PC Goodies

A gadget-lover's heaven, with a new PDA and some interesting accessories.
By Russell Kay

▲ Pharos' iGPS-180 ($209)

SOME OF MY FRIENDS think I have the neatest job, in that I get paid to play with so many of the newest gadgets and gizmos, often before they're on the market. One unexpected side effect is that I am forever getting object lessons in the difference between good design and bad.

Take, for example, three items I've beeo using recently. All are potentially great products. One has a good, though not standout, design, but some elements compromise its general usefulness. Another, full of promise, is nearly unusable for many in its current incarnation. And the third is a genius-class design that manages to be clever, attractive, reliable and functional all at once.

The good but compromised product is the $499 Cassiopeia EM-500 Pocket PC from Casio Inc. in Dover, N.J. (*www.casio.com*). It's oot as sleek a package as Hewlett-Packard Co.'s Jornada 545 [Technology, April 24] or Compaq Computer Corp.'s iPaq Pocket PC, but it has the best and brightest color screen I've yet seen on a personal digital assistant (PDA).

Incidentally, while setting up the Casio, I found that it has great connectivity. It synchronizes much more reliably with my PC via the included Universal Serial Bus cable than does the HP Jornada. And you can link it to a Code Divisioo Multiple Access cell phone and to Casio's own $105 PC-Unite data wristwatch.

Clearly intended as a consumer product, the EM-500 is available in five colors: yellow, blue, green, red and sky blue.

Another indicator of its consumer orientation is storage. While installing the Pharos Global Positioning System (GPS) unit reviewed below, I needed to copy a I0MB file to the Cassiopeia, but its l6MB of RAM didn't offer enough free space. So I grabbed a compact flash memory card I've been using with other PDAs and digital cameras — but it didn't fit.

This is the first pocket PC that's designed to use a newer, smaller type of flash memory card called a MultiMediaCard. A telephone call to Sunnyvale-Calif.-based Sandisk Corp. (*www.sandisk.com*), co-developer of the new medium, got me a sample card I could use.

There's also a business version of the Cassiopeia called the E-125, available only in silver, and it takes any Type II compact flash card, including IBM's new IGB Microdrive. For an extra $50, you also get 32MB of RAM, as well as a desktop cradle for synchronizing; the EM-500 includes only a cable.

▲ Casio's Cassiopeia EM-500 Pocket PC ($499)

The E-125 is clearly the one I'd pick if I were buying a Casio PDA for my own use. However, while the Cassiopeia is a very nice unit, I still prefer the Jornada for everyday use.

Where in the World?

I've been trying out a new GPS package for PDAs, the iGPS-180 from Torrance, Calif.-based Pharos Inc. . (*www.pharosgps.com*). This $209 package includes a GPS sensor with cable (mine was Casio-specific) and features a map display and the ability to read driving directions out loud.

I installed the GPS and mapping software with no problems. Then I tried to download a Boston-area map into the Cassiopeia and learned about the MultiMediaCard I mentioned above. Once I had the card, the Boston map downloaded easily, and I was eager to try out the GPS in the car.

My first suggestion: Don't attempt to drive and operate this GPS combo at the same time. The sensor is permanently attached to a cable that plugs into the Cassiopeia and then forks to a power plug for the car's lighter socket. But when you put the sensor on the dashboard at the base of the windshield as instructed, the Cassiopeia is left dangling upside down. You can't put the unit on the passenger seat or even oo the console; the cord needs to be at least 18-in. longer to be manageable.

So I had to pick up the Cassiopeia with my right hand to see it better, and each time I did, no matter how careful I was, I managed to inadvertently press one of the Casio's dedicated application buttons. Each time, the map was replaced by some other application.

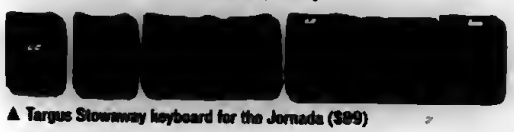
Who did the usability testing on this thing? Oh, it's fine for the passenger, but the Casio/Pharos combination is next to useless for a solo driver. And if you can't use it wheo you're by yourself, then do you really need the voice directions?

Key Accessory

I recently received Targus Inc.'s Stowaway keyboard for the Jornada. Once, in a review of Palm accessories [Exec Tech, March 8, 1999], I pooh-poohed the usefulness of a dedicated keyboard for a PDA — after all, you can always use your PC and sync to the handheld, right? Well, the Stowaway has changed my mind. Because it folds up into a package that's barely larger than a PDA itself, it's easy to take along in any carrying bag. And wheo you open it up, you have a good-quality, full-size keyboard with decent touch, and it holds the Jornada in front of you at a nicely readable angle.

The designers also built in a power connector so you can recharge the unit while it's on the keyboard.

Folded, the Stowaway is compact and latches together. It's deceptively heavy, but you can still carry it in a shirt or jacket pocket.



▲ Targus Stowaway keyboard for the Jornada ($89)

X-ray Vision

Digital X-ray systems spell the end of film and waiting for diagnostic images. By Peter Panepento

THOUSANDS OF manila envelopes packed with X-ray negatives are stashed in four rooms on two floors at Hamot Medical Center in Erie, Pa. The handling of this mountain of negatives is a positively massive task that requires the full-time attention of 11 people, all of whom have the job of labeling, cataloging and retrieving the bulky film envelopes.

"Someday, this will be empty," says radiology information systems coordinator Sherry Crane-Huston as she walks through Hamot's main X-ray file room.

Hamot, like most hospitals, has a radiology department that is still working largely in an analog universe. While even the most amateur of photographers can catalog his work on a computer through the use of mass-produced digital cameras, the world's most advanced radiologists are still dependent on a system that relies on darkrooms, lengthy lag times and massive amounts of film.

Recent breakthroughs, however, are allowing professionals such as Crane-Huston to see the potential of digital radiography — technology that could soon render Hamot's mountain of manila obsolete. Because the X-ray process is so complex and its equipment so costly, widespread purchase and implementation of a digital radiology system is still years away. But hospitals are gradually getting introduced to digital radiology technology, which even in its infancy, is cutting down on time, film and mistakes.

Hamot is one of about 100 hospitals worldwide that have direct digital radiology (DDR) systems, and radiologists say it is only a matter of time before more hospitals will be able to benefit from this still-emerging technology.

Not There Yet

"Digital radiology is not there yet," says Craig Davis, Hamot's associate director of radiology, noting that digital systems are still too costly, at a minimum of several million dollars, and too inflexible for many hospitals. "I would call it an also-have vs. a superior technology. But it will get better," Davis adds.

Hospitals that have gone digital use a system made by Swissray International Inc., an X-ray equipment manufacturer that markets the world's only DDR system. In 1991, the Swiss company committed much of its research and development resources to developing a digital system, which it was able to produce and sell for the first time in 1997. Swissray's digital system is similar to a standard analog system, except that it converts X-ray images into digital images rather than shooting them onto film.

With the digital system, an X-ray beam passes through a patient's body and projects the X ray onto a scintillating screen, which, in turn, converts the X rays into visible radiation. A high-resolution lens system is positioned behind the screen, reproducing the information on a chip, which has millions of tiny, light-sensitive fields that absorb the X-ray information. The light produces electric charges in the chip, and those charges are transmitted into electric signals. An analog-to-digital converter turns those signals into digital data and stores them in a computer for display and processing.

Benefits Are Clear

"[Hospitals] all can recognize the benefits," says Ueli Laupper, CEO of Swissray America Inc. in Elmsford, N.Y. "It saves time. It saves money, and [the images are] available anywhere."

But because the technology is still evolving and hospitals are still catching up in the information technology arena, digital radiology remains a concept with tons of potential but few practical users. And those who do use it are still working the process into their existing analog systems.

Hamot, for example, has one Swissray system that handles the bulk of the work in the hospital's eight-unit radiology department. But because of the unit's cost and some of the growing pains involved in using it, Hamot doesn't rely solely on Swissray's system for all of its procedures. Radiologists say the digital images can become distorted at times. Moreover, the Swissray system is part of a large, stationary piece of equipment, so it can't be used at remote sites.

Still, it is an important part of Hamot's radiology department. With an analog system, once the X ray is available, it can be viewed only by one person at a time. But a digital system allows specialists from different departments, or even from different hospitals, to view an image simultaneously.

David Koskoski, Hamot's associate director of radiology, says the hospital has networked the digital machine into its computer network, allowing emergency room doctors, radiologists and technicians to view results simultaneously.

With an analog system, after a technician shoots an X ray, patients and doctors must wait about 10 minutes for the film to develop. The digital system eliminates the wait.

"It's a mouse-click away," Koskoski says. "It's not a walk to a film room down three flights of stairs. The reports are all in there."

The digital system also cuts down on waste. With analog systems, improperly exposed X rays or those that don't show what's needed for a diagnosis must be retaken.

Because of the obvious benefits, Swissray is feverishly working to manufacture and market a system that it hopes will generate $10 billion in worldwide sales during the next decade. But it must contend with the fact that many hospitals are still waiting for more advanced technology before they make the costly conversion to digital.

Still, Laupper says he believes the digital system will ultimately make Crane-Huston's vision of a filmless X-ray department a reality. "Film is a technology of the past," Laupper says simply. "Digital is the future."

Panepento is a freelance writer in Erie, Pa.

A New Look At X Rays

The hardware for Swissray's direct digital radiology system looks much like that for analog systems, but the images are instantly available to an unlimited number of viewers

NetWare to Windows 2000: Making The L

It isn't easy, IT managers say. But with careful planning, you can minimize migration headaches.

By Dominique Deckmyn

NOW THAT WINDOWS 2000 appears to be gaining momeotum among the Windows NT faithful, Microsoft Corp.'s nascent operating system is getting a hard look from another constituency: NetWare users. Whether it's out of a desire to consolidate oetwork operating systems, uncertainty about Novell Inc.'s long-term viability or the desire to run applications such as Exchange 2000 that require Active Directory, at least some longtime NetWare users are mulling a move to Windows 2000.

The number of users migrating from NetWare to Windows 2000 "is not going to be massive, but I think it is going to be steady, and we are starting to see the first trickle," says Laura DiDio, an analyst at Cambridge, Mass.-based Giga Information Group Inc.

The issues involved in migrating from NetWare to Windows 2000 are very different from those eocountered wbeo upgrading from Windows NT.

NetWare administrators face a mucb more laborious task in moving users over to the new infrastructure. But if their staffs are well-versed in Novell Directory Services (NDS), that may actually give these companies a head start over NT users in implemeoting Windows 2000's Active Directory — which is a major undertaking in itself.

"Migrating [from NetWare] to Windows 2000 is something that should not be dooe quickly," says Scott Poole, Windows 2000 technical product leader at IBM Global Services in Austin, Texas.

"What we are seeing is large enterprises are most assuredly laying down the cornerstooes for the migration," be says. "My belief is this time next year, the large-scale rollouts will start happening because people will be ready."

NetWare users will find that the move isn't cheap: Michael Silver, an analyst at Stamford, Conn.-based Gartner Group Inc., pegs the average total cost of migrating from NetWare 4.x to Windows 2000 at $430 per user, with $178 of that for labor costs alone. That adds up to more than $1 million for a 2,500-user LAN. "It's a little more expensive than going from NT 4," Silver says, adding that these costs assume that 70% of servers will need to be replaced.

Who's Migrating?

Today, it's not typically the hard-core NetWare shops that are taking the plunge, says DiDio. Companies that have built their application infrastructures around NDS and are using Novell's ZENworks for desktop management and GroupWise for messaging aren't likely to budge. But even the hard-core NetWare shops are already familiar with Windows NT: Most run Windows NT systems as application servers.

Companies *Computerworld* spoke with about migrating to Windows 2000 were either using older versions of NetWare (as far back as NetWare 3.2) or had mixed NetWare 4.x and NetWare 5.x environments.

Older versions use Novell's proprietary IPX transport protocol. Moving to a pure, native Internet Protocol environment requires a significant migration effort.

"We wanted to get to pure IP, which meant moving to NetWare 5.1, and I felt that the move would be more difficult than to start afresh [with Active Directory] in parallel," says Bob Duros, systems and technology manager at the inbound division of West TeleServices Corp. in Omaha. "I had Novell consulting come in and look at my environment, and based on their input, migration to [NetWare] 5.1 had some issues."

Blue Cross/Blue Shield of North Carolina in Chapel Hill was a pure NetWare and Unix shop until 18 months ago, says NT administrator Don Osborne. The company still has about 23 NetWare 4.11 file and print servers but has started to bring in Windows NT 4.0 servers to run several applications. In order to move to a pure IP environment and solve some persistent problems with its Asynchronous Transfer Mode network backbone, the company needed to either upgrade to NetWare 5 or move off NetWare entirely.

This past spring, Blue Cross/Blue Shield decided to move everything over to Windows 2000, hoping to save on administration costs by consolidating on one network operating system. That meant moving 3,200 users from NDS to Active Directory.

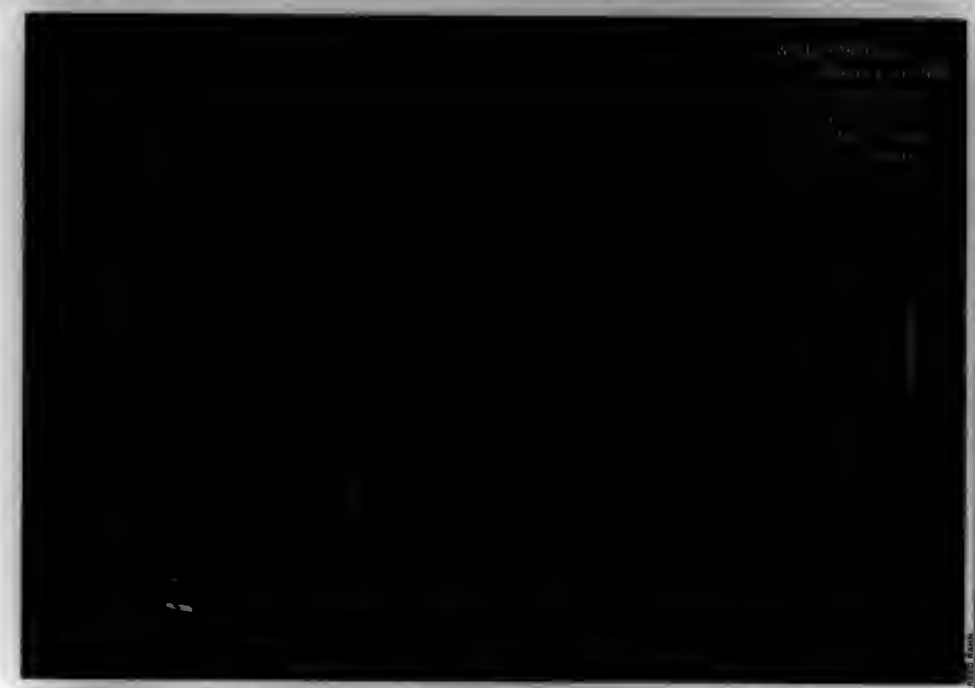
Motivating Factors

Most NetWare users — even those preparing to abandon the platform — say NetWare is stable and reliable. "There is no real technical reason to move from NetWare and NDS to Windows 2000 and Active Directory," says DiDio. "Active Directory still lags behind NDS in several areas. Novell has had six years to work out the kinks, and they have. There is ZENworks, so you don't need as many third-party tools. There are more experienced administrators."

The problem is that Microsoft's market dominance and Novell's perceived problems are eroding support for NetWare. "You can't argue with 90% market share," says Michael Brown, director of technology at Yellow Transportatioo LLC in Denver, which moved off NetWare and onto NT 4 about a year ago. NetWare "was incredibly stable," he says, adding that he has to reboot his NT servers once per week. Still, Brown says he has no regrets, be-

Migration Checkpoints

- NetWare and NDS are more mature and more reliable than Windows 2000 and Active Directory.
- Users who must upgrade from older IPX-based versions of NetWare have the most compelling case for considering migrating to Windows 2000.
- The fact that new applications such as Exchange 2000 require Active Directory may also influence the decision to migrate to Windows 2000.
- The technical issues surrounding a NetWare-to-Windows 2000 migration are often secondary to overcoming administrators' psychological resistance to leaving the NetWare platform.
- A technical staff well-versed in NetWare's NDS will have an easier time rolling out Active Directory than Windows NT users who are upgrading.
- Differences between the Active Directory and NDS directory tree structure add complexity to the migration of administrative user and file permissions.
- Some thought might be given to running parallel NDS and Active Directory structures rather than engaging in an immediate wholesale migration to Active Directory.
- Third-party migration tools help ease the pain but add to the expense.



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cause "the increased functionality is incredible."

The state of Washington and San Francisco-based Wells Fargo & Co. both have ambitious plans to build a central directory infrastructure that departments can plug into — and they've both picked Active Directory instead of NDS.

Wells Fargo has 20,000 to 25,000 user accounts in NDS — out of approximately 120,000 total employees. It also had a Windows NT 4.0 domain structure that was reaching its physical limits, says Scott Hall, enterprise engineering manager at Wells Fargo Service Co., the 13,000-strong information technology operation that supplies services to most of Wells Fargo's 120,000 employees.

However, Wells Fargo had an added incentive to choose Active Directory: The bank had been invited by Microsoft to participate in the Joint Development Program, which gave it the ability to closely follow and influence the development of Windows 2000.

After 18 months, Hall's group has completed its Active Directory migration and rolled it out on 30 hulking eight-CPU servers with 8GB of RAM each — enough to keep the company's 120,000-user, 1 million-object, 4GB directory in memory. "We went with the best we could have," says a proud Hall. "What's a couple of extra grand in hardware?"

Each of Wells Fargo's lines of business has its own funding and IT plans. "When they're ready, we're ready for them," says Hall. "We're the core infrastructure that everyone can plug into and that we guarantee will be up always."

Washington state's Department of Social and Health Services (DSHS) had similar plans, recounts enterprise networking manager Mike Frost. His nine-person team is responsible for running the agency's Microsoft Exchange e-mail system and its new Active Directory service. The department consists of eight administrations and 26 divisions, all of which will eventually plug into the directory.

"We already had a large foundation of Microsoft networking and e-mail, so [Active Directory] was a natural evolution," says Frost. One of the agency's divisions is currently testing a 6,000-user NetWare and GroupWise site. The rest of the agency is mainly using Microsoft Exchange.

Other companies may have other motives for migrating to Windows 2000 and Active Directory. The desire to roll out Microsoft Exchange 2000, which requires Active Directory, and to integrate other application servers into a single directory structure are two such factors.

"[Microsoft Exchange 2000] is definitely going to be a catalyst," says Silver. "Some people are using a future Exchange migration to justify a Windows 2000 change."

The NetWare User Challenge

Microsoft has made it technically easy to upgrade from NT to Windows 2000. But NT administrators face a huge task adjusting to the concept of a directory. For NetWare shops, the challenges are different.

"From NetWare to [Windows 2000], the biggest problems are not technological," says IBM's Poole. "The biggest issues are centered around brand loyalty. People like me who are [Certified NetWare Engineers] and spent a lot of time and money on that — having to replace that with [a Microsoft Certified Systems Engineer certification] makes people unhappy. When you get past brand loyalty and [anti-Microsoft] prejudice, NetWare people get interested."

A technical staff well-versed in NDS could give companies a head start in rolling out Active Directory, says Poole. "The first thing to understand is Windows 2000 at its most basic level is pretty compatible, philosophically, with NetWare 4 and NetWare 5," says Poole. "People who understand NetWare and NDS are more than technically qualified to be leaders in Windows 2000 migration."

Frost says he had expected to take some heat from NetWare administrators. But they are leading the charge toward implementing Active Directory. NT administrators, though, are having a harder time adapting. "From NT to Windows 2000, that's a huge shift in how things work," he says.

But NDS and Active Directory still have many differences. NDS can be partitioned, but every Active Directory server runs a complete version of the directory tree. And while both directories allow permissions to be "inherited" from parent directories higher in the directory tree, both implement inheritance in a different way — making a straightforward transfer of administrative permissions and file permissions impossible.

> From NetWare to [Windows 2000], the biggest problems are not technological.
>
> SCOTT POOLE, WINDOWS 2000 TECHNICAL PRODUCT LEADER, IBM GLOBAL SERVICES

"Some people want to move everything over into [Active Directory], and that's typically not the best way to go," advises Microsoft Consulting Services senior consultant Matt Finger, who works with customers in the design and pilot phases of Windows 2000 migrations. "You need to look at it with a fresh set of eyes. You are migrating data out of the directory, but the way it is laid out is different."

At West TeleServices, Duros chose to build a new Active Directory tree in parallel with NDS rather than attempt a complete migration. (Coexistence is indeed possible: Novell offers its DirXML tool for synchronizing NDS with Active Directory.) Duros says he wasn't particularly happy with the NDS tree and he wanted to re-evaluate network permissions.

But at the DSHS, the existing NDS tree structure was merely "cleaned up" when it was transferred to Active Directory — and the NetWare administrators were given control over that part of the tree, says Frost.

Another problem typically encountered in any Windows 2000 migration involves applications. "Most [Windows] applications are compatible," says Duros, "but we ran into some 'gotchas' with homegrown apps."

One Step at a Time

IT managers with NetWare-to-Windows 2000 migration projects still in the planning phases may take some comfort in knowing that none of the companies *Computerworld* interviewed had encountered any major problems, and all expected a reasonably uneventful — though slow and painstaking — move. In the end, it seems, slow and steady wins the race. "By taking it in a phased approach, we avoided a lot of pain," says Duros, who now has 1,000 users on Windows 2000 and Active Directory. "Department by department, small steps — resolve your issues and move on."

Deckmyn is a freelancer in Belgium and a former Computerworld reporter.

Migration Tool Kits

MOVING USERS' FILES and file permissions from NetWare to Windows 2000 – preferably without users noticing – may prove to be the biggest challenge in the migration process. Because of differences in how the two directories support inheritance, it can be hard to make sure that users have exactly the same file permissions and administrative rights under Active Directory that they had under Novell Directory Services (NDS).

Windows 2000 ships only with tools for migrating from Windows NT, but Microsoft Windows Services for NetWare 5.0 is available for $149. Services for NetWare includes a directory synchronization tool as well as software that helps migrate files and permissions. But for big migration projects, Microsoft's Matt Finger acknowledges that third-party tools are a better choice.

Vendors providing such tools include BindView in Houston and NetIQ in Santa Clara, Calif. These vendors' utilities perform tasks such as creating an inventory of security and permission settings, moving user data and user permissions to Windows 2000 and helping manage the new Active Directory tree structure.

Blue Cross/Blue Shield of North Carolina's Don Osborne has used reporting tools from BindView to gain an understanding of his current NDS permission settings, and he says he's looking for the right tool to help him migrate a terabyte of user data and permissions. The tools alone will cost him about $35,000, he estimates. By contrast, West TeleServices' Bob Duros says he doesn't expect to need third-party tools.

But most users and analysts agree that third-party tools are a necessity when moving large or complex networks over to Windows 2000 – especially when migrating from NetWare 4.x or 5.x. These tools sell in the range of $6 to $12.50 per user account. That adds considerably to the cost of moving from NetWare to Windows 2000, says Giga's Laura DiDio.

With the expense of training staff and, in most cases, bringing in outside help, the migration will turn into an expensive proposition for most users.

NetWare to Windows 2000 Migration Tools

Company: Microsoft Corp.
Web: *www.microsoft.com*
Product: Services for NetWare 5
Price: $149

Company: BindView Development Corp.
Web: *www.bindview.com*
Product: bv-Admin for Novell NDS Migration
Price: Starts at $12.50 per user

Company: NetIQ Corp.
Web: *www.netiq.com*
Product: NetWare Migrator 6.0
Price: $6 per migrated user

– *Dominique Deckmyn*

Small-scale UPS quality
that makes you say, "Wow."

A pricetag that makes you say, "How?"

Building a private business-to-business exchange has its benefits – and challenges. By Steve Ulfelder

PUBLIC business-to-business exchanges may grab headlines, but private exchanges are grabbing market share. According to Stamford, Conn.-based Gartner Group Inc., about 30,000 private exchanges are either planned or operating, as opposed to only 600 of their public counterparts.

Private exchanges may link as few as a half-dozen suppliers or as many as several hundred participants. Users say the benefits include improved communicatioo throughout the supply chain, which cao lead to cost reduction (through lower inventory) and improved quality (because problems can be addressed quickly).

With private exchanges, "you deploy based on your own requirements," says Pierre Mitchell, an analyst at Bostoo-based AMR Research Inc. "You're the master of your own domain — in security, privacy, scalability. You doo't have to agree on requirements with nine other multinationals."

So, what are the challenges involved in rolling out your own private exchange? Here's a look at three private exchanges and how informatioo technology managers implemented them. Each firm had different objectives and took different tacks to reach its goals.

Toyota Motor Sales USA Inc., a Torrance, Calif.-based branch of Toyota Motor Corp., says it hopes to use a private exchange to whack about $175 millioo off its inventory. According to Gerald Braga, Toyota Motor Sales' corporate manager for procuremeot and supply-chain management, the company's parts-supply network encompasses about 450 North American suppliers and 1,500 Toyota and Lexus dealers.

"We cootrol maybe $350 million of inventory," Braga says, and that figure doesn't include parts at dealerships. The company is implementing a private business-to-business exchange that "we think is going to let us significantly reduce that," he says. Toyota Motor Sales has boasted that it will save $30 million per year ooce the exchange is up.

To make the exchange happen, Toyota Motor Sales turned to i2 Technologies Inc. in Dallas. Toyota will use i2's TradeMatrix product to manage inventory and better predict delivery dates.

Braga says the project was driven by a desire to work toward daily ordering. "We had a real need for better collaboration at the supplier level," he says. "And we had to be able to communicate with the dealers at the opposite end [of the supply chain] to let them know when parts would be in." Thus, the important functions for Toyota's exchange include ordering capabilities, communication tools and demand-planning.

Dealer Daily, Toyota's proprietary parts-ordering software for dealers, will be integrated with the TradeMatrix tools. "That'll give us the front end and the back end," Braga says. "The in-between parts will all be able to communicate through that network."

The tools i2 will replace are ancient: homegrown systems developed 30 years ago, Braga says. "Even the most receot [Toyota ordering tools] still use Cobol," he says. "We're talking hard-coded batcb processing."

Interestingly, though, Toyota isn't replacing its legacy ordering system altogether. Rather, an incremeotal shift is planned. The i2 tools will interface with the old Cobol operational systems, Braga says. But users will see only a new i2 interface that he calls an overlay. "As time goes on," Braga adds, "we'll replace the old system."

San Jose-based KLA-Tencor Corp., a supplier of process cootrol and yield-management tools for the microelectronics industry, says having a small, private exchange is the secret to improved quality.

Last year, the company, whose annual revenue tops $1 billion, launched an effort to raise quality levels. KLA turned to Datasweep Inc. in San Jose, which makes business-to-business exchange and collaboration software for high-tecb manufacturing firms such as PC vendors and makers of medical equipment [Technology, Sept. 25].

KLA created a business-to-business exchange that links the company to two major suppliers, and it's planning to add several more suppliers to the exchange this fiscal year. It tracks every component of every unit that the company has ever handled.

According to John Moore, e-quality project manager, KLA initially implemented the software in-house to work out the bugs before extending the program to suppliers. "We took the product and customized it quite a bit," Moore says. "It's a very flexible tool, but you always have the ability to create self-inflicted wounds."

Moore says KLA had an alpha test running in two divisions within eight weeks. The company projects quality improvemeots topping 25% in targeted areas. KLA is now extending its exchange to include traditional partners.

Getting the Word Out

If terrorists released toxic gas into the atmosphere above your hometown, it's a fair guess that you'd appreciate having a simple, browser-based means of tracking the resulting poisonous cloud.

> You're the master of your own domain – in security, privacy, scalability. You don't have to agree on requirements with nine other multinationals.
>
> PIERRE MITCHELL, ANALYST, AMR RESEARCH INC.

MEMBERS ONLY

That's an oversimplification of what Innovative Emergency Management Inc. does, but not by much. The Baton Rouge, La.-based risk-management consultancy specializes in disaster simulation modeling. Its clients include government agencies and the military.

While business-to-business exchanges are most often associated with product-oriented companies, Innovative Emergency Management is creating a private exchange for its service customers. According to Gary Asmus, a process and data engineer, about a year ago, the company decided to create a "knowledge-sharing database for corporate data." This would amount to a private exchange built not around making transactions but around providing information.

"We're a knowledge engineering company; we wanted to share this knowledge with clients," Asmus says. Because projects tend to take years to complete, sharing project-status information with clients could prove especially valuable.

Initially, Asmus says, Innovative Emergency Management planned to build the exchange itself, but "when we did a requirements list [and] looked at our development costs, [we decided it] would be more expensive to develop ourselves."

Having decided to buy rather than build, in January, Innovative Emergency Management chose Viador Inc., a Mountain View, Calif.-based company that specializes in "business-to-business e-portals." Asmus says that while much of the available portal/exchange framework technology was "immature," Viador's E-Portal Suite was better developed.

EXCHANGES

Capacity, Breadth, Speed

One of E-Portal Suite's appeals was its ability to handle a large amount of structured data. It includes Viador Gateway, which allows efficient access to such structured databases as Oracle, Microsoft SQL Server and DB2.

"We needed to handle large amounts of structured data," Asmus says with a laugh. "You call the National Weather Service, they'll give you as much data as you can handle."

Steve Dille, Viador's vice president of marketing, says the advantage of the portal model is its breadth. "We are a framework," he says. "That lets you take any systems — legacy systems, CRM, etc. — and plug them in. We set a broader context."

To accentuate that big-tent philosophy, Viador has published all of its application programming interfaces. This makes it easy to plug customer relationship management tools and other products into a Viador framework, Dille says. "Half our customers build completely customized portals," he says.

Speed is another advantage of portal-style exchanges. Viador claims implementation times as short as several weeks. Innovative Emergency Management got its pilot program — an internal version of its knowledge-sharing database used by the company's six offices — up and running within a few months, Asmus says.

He's beginning to roll the system out to clients; the company plans to include three or four clients in the exchange within the next six months. This phase is simple in a portal-based system, because the only thing customers need is an access password.

Asmus says he has nitpicked with Viador over some interface details, but overall, "Viador's very reliable. You don't need to worry about details."

IT organizations planning private exchanges must define goals early and watch out for creeping implementation costs, experts say. With the field in its infancy, vendors are jostling for position, changing their claims almost weekly and often promising more than they can deliver.

Regardless of what any vendor says, IT managers should be prepared to apply a lot of elbow grease when implementing a private exchange. According to experts, wherever there's an interface between two applications or data sources, there are sure to be headaches.

Ulfelder is a freelance writer in Southboro, Mass.

InfiniBand

DEFINITION

InfiniBand is a standard describing a new architecture and specifications for data flow between processors and intelligent I/O devices. Replacing the Peripheral Component Interconnect bus in servers, InfiniBand promises greater bandwidth, increased expandability and enhanced flexibility in server design.

BY MARK HALL

As computing power gets concentrated in data centers, eliminating performance bottlenecks and improving systems management are becoming ever more critical. I/O subsystems are at the root of many of these problems. InfiniBand is a new I/O technology that many claim will eliminate the hassles caused by the venerable but tired I/O architecture of today.

This month, the Portland, Ore.-based InfiniBand Trade Association (IBTA) released Version 1.0 of its eponymous I/O specification. The 180-member trade group includes all the major systems, semiconductor and peripherals makers in the industry and is the result of last year's merger of two competing I/O standards — Future I/O and Next Generation I/O [Technology, July 26, 1999]. With the specification in hand, IBTA members will begin designing and building InfiniBand-ready products that should appear on the market late next year.

More Than I/O

InfiniBand will primarily replace the Peripheral Component Interconnect (PCI) bus for servers. It offers far more capabilities and performance than PCI. Although PCI has proved reliable and fast and will continue to increase its speed — reaching 1G bit/sec. with the release of PCI-X [Technology, June 14, 1999] — architecturally, it lags hebind InfiniBand's channel design.

For example, witb InfiniBand systems, designers and information technology managers can cease to think about I/O as always heing part of the server — specifically, being inside the enclosure.

With InfiniBand, remote storage, networking and connections between servers are accomplished by attaching all devices through a central, unified fabric of InfiniBand switches and links. That's how InfiniBand solves the distance issue of bus-based architectures like PCI, which measures its distance from a CPU motherboard in inches or even centimeters. InfiniBand's channel design lets I/O devices be placed up to 17 meters away from the server using copper wire, as mucb as 300 meters using multimode fiber-optic cable or even 10 kilometers away with single-mode fiber.

By eliminating the need for an internal I/O bus system, arcbitects will he rethinking bow to package servers. Analysts at Illuminata Inc. in Nashua, N.H., say they think a server's footprint could be cut by as much as 60%, immediately benefiting crowded data centers by replacing bulking servers with more streamlined machines.

Instead of specifying servers with a certaio number of PCI slots, most systems will simply come out of their crates with a single InfiniBand Host Channel Adapter (HCA). The HCA will connect a computer to a cbannel-based InfioiBand switch that links it to mass storage systems, routers and other peripherals outfitted with InfiniBand Target Cbannel Adapters (TCA). The switch provides point-to-point connections through its fabric.

Today, if you need to add more storage to a server and you've run out of PCI slots, you need to bring down the server, add a PCI expansion board, connect the storage device, configure the array with the operating system and then reboot the server. With InfiniBand, you simply connect your disk array's TCA to the InfiniBand switch. The intelligence in the channel adapters does the rest, without disrupting the server's operation.

The channel adapters are intelligent devices that handle all I/O functions without having to interrupt a server's CPU. For example, when the InfiniBand's fabric initializes itself, it discovers all HCAs and TCAs in the fabric and assigns them logical addresses. It keeps track of devices through a polling algorithm that lets it find new channel adapters as they're added to the fabric.

Links to Everywhere

The InfiniBand specification includes options for channel adapters to contain one, four or 12 links for various performance needs. These three link options handle bidirectional data rates of 500M bit/sec., 2G bit/sec. and 6G bit/sec., respectively.

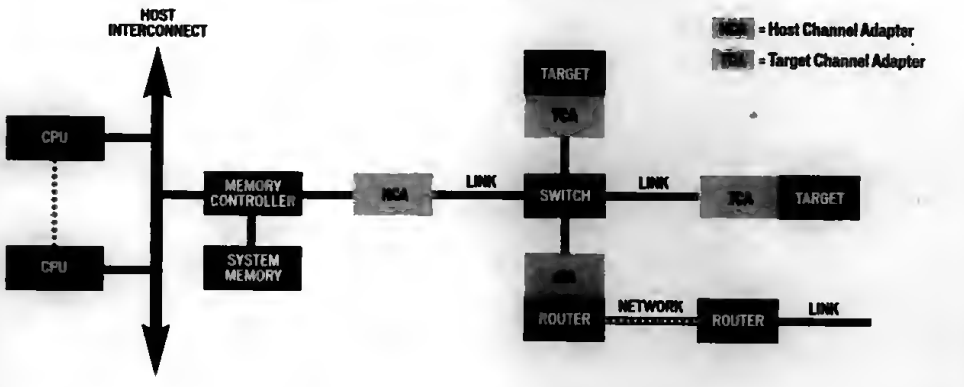
InfiniBand uses the exteoded addressing found in Interoet Protocol Version 6. Packets that are transmitted contain source (HCA) and destination (TCA) addresses in the InfiniBand Global Route Header, which lets InfiniBand switches immediately shift the packet directly to the correct device.

You can cascade InfiniBand switches for fail-over protection. Where PCI buses have always preseoted a single point of failure in a server, InfiniBand's external locatioo and channel architecture let you build in automatic backup and recovery — heretofore impossible with bus systems.

Bob Pearson, vice president of business development at Vieo Inc. in Austin, Texas, says InfiniBand will unleash application developers to create much faster software, because they'll be able to have the application make calls directly to an I/O device instead of traipsing through the CPU.

For example, a simple open- or close-file request on a PCI bus must pass through the microprocessor to fetch the file. But, Pearson says, with InfiniBand systems, applications can make the calls directly to the storage system that manages the file, freeing the CPU from unnecessary interrupts.

InfiniBand Architecture



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Start-up's Software Makes E-Mail Smarter

Tacit Knowledge Systems transforms e-mail into an information repository

BY TERI ROBINSON

HALF THE battle of managing knowledge is identifying the correct person to answer a question or solve a problem.

"People often don't know who in a company to request information from," says David Gilmour, founder, president and CEO of Palo Alto, Calif.-based Tacit Knowledge Systems Inc. "So, they do the dreaded thing and send out a broadcast e-mail, which ultimately impairs productivity."

Gilmour says Tacit offers a way for the enterprise to overcome this obstacle using e-mail. The start-up's KnowledgeMail and KnowledgeMail Plus products work transparently with existing e-mail systems such as Lotus Notes or Microsoft Exchange, weaving the messages that workers pass back and forth into a knowledge infrastructure.

Knowledge by Mail

KnowledgeMail is the brainchild of Gilmour, a former analyst at Cambridge, Mass.-based Giga Information Group Inc. "Knowledge management was associated with capturing and managing knowledge," says Gilmour. "And we said, 'What if that's never going to work?' "

Instead, Tacit focused its attention on "managing the knowledge worker," says Nathaniel Palmer, a chief analyst at The Delphi Group in Boston. KnowledgeMail products look for keywords and phrases in e-mail to create a profile of a worker's knowledge and skill set. It uses the profiles to field co-worker requests for expertise and forwards them to the desired expert.

San Francisco-based MimEcom Corp., a start-up that provides hosted e-commerce services, is implementing KnowledgeMail with its Microsoft Exchange Server. MimEcom said it hopes to encourage its 250 workers to share knowledge so they can better respond to requests for proposals. "If we didn't respond properly or at all, it could be a missed opportunity worth $2,000 per month or $5 million," says Brian Davies, director of global services management at MimEcom.

Davies notes that often, "new people come in [to the company] and have questions. Who do they ask? You can integrate [KnowledgeMail] into your back end, and even if you don't use it, KnowledgeMail collects information on you automatically."

While that may sound a little intrusive, Gilmour insists that the opt-in nature of its KnowledgeMail Plus enhanced product offers more than adequate protection. "The information in the profiles lives beyond the reach of the enterprise," Gilmour says. "The user can modify the profile and determine what's made public, but the company can't see it or touch it. We can't reveal anything about you unless you give your permission."

Data Control

John Old, information management focus-area leader at Texaco Inc. in Houston, says KnowledgeMail "is the only product I've seen that addresses the privacy issue." Between 300 to 500 employees at Texaco currently use the system.

Giving knowledge holders that type of control over data could translate into low participation. But even if an employee chooses not to release profile details, the system will still pass co-worker information requests anonymously to that employee, who can choose whether or not to respond.

Palmer says he believes that Tacit's technology is well-positioned as an intermediary between the knowledge holder and the knowledge seeker. And because it works with major e-mail systems, it doesn't alienate the big e-mail vendors. What's more, its workings remain transparent to the user.

Old notes that the system is easy to implement. So far, the only stumbling block has a more human face. "We didn't spend enough time talking to people about the privacy issue," Old says. "We needed to explain they had control over what was published, that this isn't Big Brother mining e-mail and using it for some evil purpose."

Beyond Mail

Tacit is meeting criticism from competitors who say its approach is too e-mail-centric. KnowledgeMail 1.3, released in April, can aggregate information from a company's portals, intranets and directories.

However, Navi Radjou, an analyst at Cambridge, Mass.-based Forrester Research Inc., says he expects that Tacit will have to pump up its offerings and possibly partner with a messaging vendor as more competitors appear. ▶

Robinson is a freelance writer in New York.

TACIT CEO DAVID GILMOUR: "We wanted to create [a knowledge management system] that was fully automated"

Tacit Knowledge Systems Inc.

Location: Palo Alto, Calif.

Telephone: (650) 251-2000

Web: *www.tacit.com*

Niche: E-mail-based knowledge management

Why it's worth watching: KnowledgeMail could help workers finish tasks more efficiently.

Company officers:
- David Gilmour, president and CEO
- Bill Lonergan, chief financial officer
- Robert Poon, vice president of engineering
- Jim Weil, senior vice president of sales
- Lance Devin, vice president of marketing

Milestones:
- December 1997: Incorporated
- November 1999: KnowledgeMail launched
- April 2000: Awarded patent for profiling technology

Employees: 52

Burn money: $10.9 million from Draper Fisher Jurvetson and Reuters Venture Capital

Products/pricing: Pricing for KnowledgeMail and KnowledgeMail Plus 1.3 starts at about $395 per seat, with volume discounts available.

Customers: Texaco, MimEcom, J. P. Morgan & Co., Giga Information Group

Red flags for IT:
- Knowledge base has narrow e-mail focus
- Unclear how it will scale in larger environments
- Faces increasing competition from e-mail vendors such as Lotus
- Possible acquisition target

COMPUTERWORLD emerging companies

[the buzz] STATE OF THE MARKET

$1.5B Market

Nathaniel Palmer, chief analyst at The Delphi Group, says the market for knowledge management products like KnowledgeMail "will be substantial." Boston-based Delphi estimates the knowledge management market at $1.5 billion this year.

As companies, particularly dot-coms, continue to grow, notes Palmer, capturing knowledge from a fluid workforce and managing it efficiently will grow in importance. Vendors will continue to attack knowledge management with an increase in e-mail-based approaches.

E-mail providers like Lotus Development Corp. have started to show an interest in these types of features as a way to breathe new life into their own e-mail products. Lotus' first such product, the Lotus K-Station knowledge portal, recently made its debut.

"Tacit is very specific to the e-mail environment, and the others like Orbital aren't," says Palmer. Which isn't necessarily a bad thing. A survey by San Jose-based Dataquest found that 46% of information technology managers in large enterprises ranked e-mail as one of the top 10 mission-critical systems. Brian Davies, director of global services management at MimEcom, says he wanted an e-mail-based solution. "Our research found that Tacit is the only product that did [knowledge management] through e-mail," he says.

Navi Radjou, an analyst at Forrester Research in Cambridge, Mass., says Tacit Knowledge Systems is aware of the competition. Among the ways the company could boost KnowledgeMail is by adding location and instant-messaging capabilities.

"The next step is once you find who is the right expert, you will be [able to find] out whether or not that person is online and [his] status," says Radjou.

Tacit's competitors, according to Palmer, include the following:

Orbital Software Inc.

Framingham, Mass.
www.orbitalsw.com

Orbital's Organik provides a scalable, person-to-person question-and-answer infrastructure for Internet and corporate portals.

Autonomy Inc.

San Francisco
www.autonomy.com

Autonomy's ActiveKnowledge software extracts meaning from pieces of text a user reads or writes.

- Teri Robinson

Skills That Lure Investors

Have the urge to launch your own dot-com? Here's a look at the skills investors expect you to have in order to draw their interest. By Jill Vitiello

IT'S EVERY technologist's dream. Hunker down with a few buddies, create a product, launch a business, capture a market, arrange the initial public offering and sit back — waiting to rake in the millions.

If only it were that easy and that predictable. For any company to achieve acceleration, it needs the power of money behind it. And attracting investors takes a strong combination of technical know-how, business savvy and guts.

Consider the experience of one recent start-up.

START WITH A GREAT IDEA

College 411 was a dot-com whose founders had the right stuff to get their business nff the ground — and who learned plenty along the way.

"I was dabbling on the Internet and wondering what type of business would make sense for me as I was getting ready to graduate from Stanford," recalls Travis S. Bowie. "I realized that the college-student marketplace was pretty much wide open on the Net and that, despite my youth, I did have some form of expertise because I was in touch with what that market needed."

Bowie, a college senior majoring in economics and international relatinns in 1998, hooked up with his buddy Dylan Vaughn, a senior majoring in symbolic systems. Together, they hatched College411.com, a Web site that provided information, resources and discounts to college students.

"Travis is the business genius," says Vaughn. Bowie's training in economics and his ability to attract skilled partners gave College 411 its jump-start. Vaughn, the computer whiz, led the product development.

BUILD A PLAN AND A PROTOTYPE

The two entrepreneurs researched their idea at Stanford University in Stanford, Calif., where they both continued to carry their senior course loads.

They committed themselves to working four hours every weeknight on College 411, recalls Vaughn. By April of last year, they had written a comprehensive business plan and built a prototype of the Web site. They also recruited another key partner, Nate Boswell, a history and political science major, who was responsible for business development and Web content and design.

WORK YOUR CONTACTS; LEARN TO NEGOTIATE

Armed with their plan and a prototype, the College 411 founders began contacting all the influential people they knew in Silicon Valley. They met with former employers at AltaVista Co., Lycos Inc. and Amazon.com Inc. and faculty members at Stanford.

The young entrepreneurs asked for introductions to attorneys and venture capitalists to help finance their new company. Thanks tn these mentors, College 411 gained momentum. One of the most prestigious law firms in the Valley took them seriously and helped them find seed money, says Bowie.

"The first venture-capital meeting that Dylan and I went into, we didn't know what we were doing," admits Bowie.

The adviser who accompanied them kept silent during the meeting. Later, he gave them a crash course in how tn present a convincing argument for capitalization. "Soon, we were sitting across the table from an investor, looking him in the eye, talking seriously about him giving us $5 million in financing," says Bowie. "We were still just a couple of 23-year-olds, but we learned how tn negotiate effectively."

According to the College 411 founders, venture capitalists were impressed by their research of the market and the npportunity it represented for online sales. Bowie says the venture capitalists must have been also favorably impressed with their confidence and passion for the project because they agreed to back it.

With seed money in the bank, College 411 was in business. The founders began recruiting employees and moved the company into nffice space in San Francisco.

WELCOME GROWTH

By the end nf the year, the College 411 team was working on getting commitments for its next round of funding. In the process, the founders were meeting with other companies that had the potential tn become business partners.

One nf thnse firms was Student Advantage Inc., a competitor that College 411 had known about from the outset. Bostnn-based Student Advantage launched in 1992 and went public last year with more than $40 million in revenue and 2 millinn active members, according to CEO Ray Sozzi Jr.

When the two companies met earlier this year tn discuss how they might work together, they decided instead nn an acquisitinn. In a stock-fnr-stock deal — finalized in May — Student Advantage acquired College 411.

Sozzi, who operated several nn-campus businesses while he was a student at Dartmouth College in the 1980s, began Student Advantage to capture the buying power of college students and to market it to corporations, a model similar to the American Association of Retired Persons and the American Automobile Association.

A GOLDEN OPPORTUNITY

"We saw in College 411 specific, sophisticated tools that we wanted to incorporate intn Student Advantage," explains Sozzi. He says he was drawn to the College 411 founders' knowledge of the student market and their ability to get as far as they did in the competitive dot-com world. While it wasn't the nriginal intention of the team to be acquired by a competitor, the entrepreneurs recognized a golden opportunity when they saw one.

"It's difficult to create a viable, profitable model on the scale needed to win in this space," says Bowie.

"We advanced the dream," says Vaughn. "We're excited about bringing our combined vision to the largest number of people possible."

Vitiello is a freelance writer in East Brunswick, N.J.

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Software Engineer Analyzes, designs develops, implements, tests and supports advanced software systems for global manufacturer of medical diagnostic imaging equipment. Participates in concept development and analysis. Works on cross-functional engineering teams to design and develop software to support one or more modalities such as magnetic resonance (MR) computed tomography (CT) ultrasound x-ray and/or other types of medical diagnostic equipment. Assists in modifying or enhancing existing software systems. Stays abreast of emerging technologies and recommends software system alternatives. Participates in the development of engineering documentation. Utilizes and incorporates Six Sigma methodology into the software development process whenever possible. Provides technical support during the entire lifecycle. Required is a Bachelor of Science degree in Computer Science or Electrical, Electronic or Computer Engineering and six (6) months of training in the following: designing and developing software utilizing various programming langges, including C/C++, Java, Motif and Perl working with NT and UNIX platforms, and working with object oriented design methodology. Monday through Friday, 8:30 am to 5:00 pm. 40 hours per week. $46 000 annually. Qualified applicants may submit two (2) copies of resume and cover letter to: Chair Phoutavan, File #C101727, DWE-ALC, PO Box 7972, Madison, Wisconsin 53707-7972. Reference File #C101727

Software Engineer Nashua, NH. Design develop, document, test & implement various softw modules research develop deliver enhance an internally developed softw applic & resolve problems using related technologies install Oracle databases manage development testing & production of softw applics & databases configure Oracle Web server, applic tuning, backup & recovery, & database security maintenance. implement several business Objects and Abilers use Sun Solaris Windows NT/95, PL/SQL PRO*C, UNIX, C++, Visual Basic, Visual C++, HTML & Microsoft ACCESS. Qualifs MS in Comp Sci, + 2 yrs. exper in job offrd, 40 hrs/wk, 9am-5pm, $76 294/yr. Send two copies of resume for applic to Job Order # 2000-367, P O Box 989, Concord, NH 03302-0989

Programmer Analyst (Micro/Web) - Multiple Openings

Structured systems analysis, design development testing quality assurance implementation, integration maintenance and support of integrated client-server based systems for business financial banking, manufacturing and other commercial business application systems in a multi-hardware multi-software environment using centralized or distributed relational database management systems. 4GLs (Fourth Generation Languages) and other GUI (Graphical User Interface) front-end tools. Analysis, design and development of client-server applications using object-oriented methodology. Bachelor s Degree (or equivalent) in Computer Science-Math-Engineering-Science/Business-Commerce and 1 yr experience in job offered or as Software Engineer/Systems Analyst are required. Must have appropriate combination of skills as follows: 1 of A and 2 of B, or 2 of A and 1 of B, or 3 of A. A includes Oracle, Sybase, Informix, SQL Server, Progress, Ingres, Access and Proxy Server, and B includes PowerBuilder, Visual Basic, MS Windows, Visual C++, JAM, APT, SQL, SQL*FORMS, ESQL/C, GUPTA SQL, Progress 4GL, Informix 4GL, C, Java, Lotus Notes, HTML, CGI, IIS, ASP, Front Page, Perl and Java Development Kit (JDK). High mobility preferred. 40 hrs/week, 8 am - 5 pm. $53 096 - $75 000 per year. Qualified applicants should contact or send resume to Mr. Terry N. Faust, Manager, Washington County Team, PA Career Link, Metcraft Center, Suite 150LL, 90 West Chestnut Street, Washington, PA 15301-4517. Refer to Job Order # WEB 130057

Developer

Position Description:

Responsibilities include design, construction, development, testing and implementation for MTW and its customers. Work along side of, and interface with MTW teammates, the user community, and MTW management to execute day to day work. Utilize Cool:Gen to write detailed descriptions of user needs, program functions, and steps required to develop or modify computer programs. Utilize Cool:Gen to prepare work flow charts and diagrams to specify operations to be performed. Utilize Cool:Gen to develop new information systems to meet current and projected needs. Prepare technical reports, memoranda, and instructional manuals as documentation of program development. Skill sets/Qualifications: Bachelors degree in computer science or a related discipline. Minimum of one year prior Experience which must include the following: Cool:Gen Development experience (Note: Report Composer experience is a plus). Extensive use of Cobol and/or C/C++. Full life cycle development experience (Analysis, Design and Construction). Component Based-Development experience a major plus. Experience developing in NT environment. Extensive use of DB2 Oracle, UDB, DB2/2 or other relational databases. Minimum 6 months (included in the one year) use of GUI or Web Development Languages (e.g. VB, VBScript, JAVA, HTML, etc.)

Please submit resume to,
Job 1002
Email to: jobs@mwcorp.com

Senior Software Engineer (multiple openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation using relational data bases management systems (RDBMS). Work involves extensive travel and frequent relocation. Must have 1 year of experience using 1 from Group A and 2 from Group B OR 1 from A and 1 from B and 1 from C OR 1 from A and 2 from C. A) DB2, FoxPro, Informix, Ingres, MS-Access, Oracle, Paradox, Sybase and Unify. B) AIX, DOS, HP-UX, MVS, Novell, OS/2, Sun OS, UNIX, VAX/VMS, Windows, C) 4GL, APT, C, C++, COBOL, Case Tools, C Shell, Crystal Reports, E-SQL, Easytrieve, JAVA, ODBC, PowerBuilder, PowerDesigner, Power J, Power++, S-Designer, SQL Shell Script, Visual Basic. Master's degree in one of several limited fields: Computer Sci/Apps, Eng, Chem, Math, Physics or a scientific or business related field. Will accept Bachelor's degree or foreign equivalent plus five years of progressive experience in computer professional. Salary is $75,000 per/yr, 40 hrs/wk, 8:00-5:00 p.m. Please submit resumes to: Ms. Sue Notermicola, Supervisor, Fayette County Team, PA CareerLink, 22 Iowa Street, Uniontown, PA 15401-3513. Job Order No. WEB 130638

PROGRAMMER/ANALYST: Design and develop computer applications and/or web-based applications as per client requirements. Analyze, design and develop reports as per user technical and functional requirements. Work with business analysts and/or managers to design technical solutions to business problems. Write detailed business and technical specifications and develop coding logic. Will code, test, debug and install systems. Will interact with and users and train new users. Will utilize technologies like Windows NT, UNIX, Oracle, SQL, PL/SQL, Crystal Info, Intnet, Java, Java Servlets and others as required by client and/or project requirements. Minimum requirements include a Bachelor Degree or equiv in Engg/CS/Sci/Elect or related and 2 years of related experience. Full-time position (40/wk, 9:00am-5:00pm). Salary $49776.40/yr. Overtime n/a. Must have proof of legal authority to work in the United States. Send your resume to the Iowa Workforce Center, 215 Watson Powell Junior Parkway, Des Moines, Iowa 50309-1729. Please refer to Job Order IA110123. Employer paid advertisement.

Sr EC/EDI Programmer/Analyst. Maintains, enhances and develops electronic commerce programs in client server environment to move data electronically between customer and supplier through electronic commerce to implement enterprise resource planning information systems. Applies EDI-II concepts to programs. Conducts programming in ABAP/4 language in SAP R/3 and mapping in GENTRAN utilizing GENTRAN server applications. Writes BDC's in SAP to upload data into the SAP database. Implements trading relationships into electronic commerce translator and web area network (VAN) from corporate client requests, from testing to production. Writes BDC, ALE and RFC for transactions by configuration in ABAP/4 in SAP. Operates on ORACLE database in C. Position requires bachelor's degree in computer science or electronics engineering. (If foreign degree must be equivalent to U.S. degree as judged by credentials evaluator.) Position requires 1 year's experience in the job duties listed above. Position based in Lisle, IL. Please send resume to Human Resources Dept, VS Mates Incorporated, 2222 Wellington Ct, Lisle IL 60532. Fax 630-548-2899. E-mail: vsumth@moles.com

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Design Engineer III: Analyzes current and new product development of agriculture and construction equipment drivetrain systems, including transmission of small sizes to large size tractors, combines, construction, wheel loaders, loader backhoes and trenchers. Performs figure life analyses to splines, bevel spur helical gears and ball, needle, taper roller bearings by using DADISP and Sonnet Easy software and correlates results with real life testing through test lab. Conducts capability and reliability analyses to mechanically controlled and power-shift clutches and synchronizers. Evaluates V-Shape belt life by using Gates method. Supplies linear and non-linear elastic and dynamic Finite Element Analyses to transmission components by using COSMOS/M, HyperMesh, NASTRAN and I-DEAS. Prepares technical reports for design predictions and material recommendations. Performs design lay out for transmission housing, shafts, gears, bearings and other components by using Pro/Engineer. Pro/Surface and Pro/Mechanica. Applies manual design for creating, optimizing new designs and improving existing products using Taguchi method. Finalizes transmission parts design to meet ISO (International Organization for Standardization) and EEC (European Economic Community) safety and operating standards for both agricultural and construction equipment. Improves engineers' design efficiency by developing user-friendly analytical software for off-road vehicle performance evaluation by using Visual C++ and Visual Basic as implementation tools. Develops and implements drivetrain analytical tools in both IBM Mainframe platform and PC windows 16-bit and 32-bit (NT) operating systems by using Visual FORTRAN. Builds and maintains design criteria, engineering material databases by using Microsoft Access. Supervises Drafters and Technicians from time to time as required. Required is a Master of Science degree in Mechanical or Agricultural Engineering and two (2) years of experience in the position being offered (i.e. Design Engineer III) or two (2) years of experience in the related occupation of Mechanical Engineer. As part of the two (2) years of required experience in the position being offered or in the related occupation the applicant must have had experience in analyzing and designing drivetrain systems using Finite Element Analysis and Pro/Engineer, and had experience in using Visual C++, Visual Basic and Visual FORTRAN. Monday through Friday, 8:30 am to 5:30 pm. 40 hours per week. $66 731 annually. Applicants must show proof of legal authority to work in the U.S. Applicants may submit two (2) copies of resume and cover letter to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 7 North, Chicago, Illinois 60605, Attention: Brenda Kelly, Reference # V-IL-23400-K. NO CALLS. An employer paid advertisement.

Level 3 Communications is seeking qualified individuals for employment of Senior Engineer in the following areas in Denver Colorado:

Senior Engineer (SE1000): Involved in all aspects of the software development life cycle from requirements gathering through production support. Develop, test and integrate components of the enterprise workflow management system. Strong technical skills and Object Oriented development technologies required. Required education: Degree in Electronic Engineering. Required experience: 5 years experience in software engineering.

Senior Engineer (SE2000): Development of Document Management, Decision Support Systems and Data Warehouse systems. Assist in the development of custom front-end applications to support implementation of Enterprise Document Management System. Assist in requirements gathering, implementation and training. Oracle SQL, C, Brio, PL/SQL, Discover and Financial Applications required. Required Experience: 5 years experience in software engineering.

Senior Engineer (SE3000): Accurately identify sales-marketing software application user requirements. Design and build databases for efficiency and accuracy. Build database objects, identify data issues and provide necessary solutions. Set standards for database programming which would be used by all other developers. Oracle 7.x, PL/SQL, Unix. Developer 2000 knowledge required. Required experience: 5 years in software engineering.

Senior Engineer (SE4000): Develop PL/SQL programs, understand database design, have working knowledge of Oracle HRMS and participate in integration with Oracle Applications. Required Experience: 5 years in software engineering.

Please send resume via email to: RBAResumes@Level3.com. Please include the job number when applying.

APAR INFOTECH CORPORATION

Multiple positions available for Programmer Analysts and Software Engineers with at least two years of work experience in a computer software environment and knowledge and proficiency in one or more of the following skill sets:

DBA: Oracle, Sybase

ERP/CRM: SAP R3, ABAP/4, Application Modules, Oracle Applications and tools, Broadvision, Siebel, Clarify, Vantive

Mainframe: UNISYS 2200, IMS DB/DC, DB2, CICS, COBOL, MVS, ADABAS, NATURAL

Midrange: AS400, J D EDWARDS

Client Server: Visual Basic, ASP, ColdFusion, SQL Server, Oracle, Sybase Developer 2000, Designer 2000, PowerBuilder, UNIX, C, C++, VC++, OOAD, Java, HTML, Active X, E-Commerce, Unix System Administration, Win NT Administration, Weblogic

Programmer Analyst positions require a Bachelor's degree. Software Engineer positions require a Master's degree or a Bachelor's degree plus five years of progressive work experience to be equivalent to Master's degree. All degrees should be in Computer Science or a related field. Extensive travel and frequent relocation.

Qualified applicants should submit a resume and cover letter clearly indicating the position for which the applicant is applying to:

The Recruiting Manager, APAR Infotech Corporation
2581 Washington Road, Suite 232
Pittsburgh, PA 15241
(412) 851-1000
Website: www.apar.com Email: recruiter_pit@apar.com

Level 3 Communications is seeking qualified individuals for employment in the following positions in Denver Colorado: Network Engineer, Senior Analyst, Director, International Product Development, Senior Engineer, Engineer, Transmission Network Engineer, Warehouse Acquisition Engineer, Senior Engineer.

Network Engineer (NE1000): Responsibilities include design, planning and implementation of architecture as our network grows. Five years key design experience in IP routing, ATM, DSPP and BGP4. Experience with the following systems are required: Cisco 105 and 7500 12000 series routers, FORE ASX4000 switches, and Ascend TNT. Preferred knowledge and skills: UNIX, DNS and RADIUS.

Senior Analyst (SA1000): Will develop computer software and will write code, debug, and document software. Will analyze software requirements to determine feasibility for use in developing total system solutions that address major business processes used to manage the overall enterprise. Participate and interact with the customer in strategic design process. Translate business needs into technical system solutions. Ensure technical correctness and completeness of integrated systems designs, install software and write programs to support software. Required degree: Bachelor of Science or related discipline. Required experience: 5 years experience as systems programmer or analyst.

Director Intl Product Development (DIPD1000): Development and implementation of the Level 3 services in its international markets. Negotiate with 3rd party providers that will provide off-the-shelf service capabilities, and maintain on-going business relation with selected partners. Management of team of product development managers. Coordinate and assist with the rollout and implementation of the services in various international markets. Responsible for management of engineering requirements, internal system support requirements and process development with customer care. Work closely with the other international offices to make sure that services support all international requirements and country-specific features. Masters or Telecommunications, Computer Science or Business. 5 years of International Telecom business and product development and management, using the following data transmission protocols: 1. Data packet switching protocol ("X25") 2. Line Access Protocol version D ("LAPD") and 3. Mobile and wireless communication protocol GSM.

Senior Engineer (SE6000): Design and development of various computer systems and related technologies. Work with Netscape Application Server internal architecture and deployment models for high volume web based applications, installation, management and monitoring of Netscape Application Server and Microsoft IIS. Configuration management in a Java development environment using PVCS and ClearCase. Required Degree: Bachelors of Computer Science or related Engineering discipline. Required experience: 5 years of software engineering.

Engineer (ENG1000): Responsible for systems analysis, design and coding the service order entry application and systems. Create detailed systems design documents, code and test order entry systems. Work with the user requirements onto relevant business requirements from which the systems design document can be created. Knowledge of Relational DB, Application Development (client/server) required. Required education: Bachelor of Computer Science or related Engineering discipline. Required experience: 5 years in software engineering.

Transmission Network Engineer (TNE1000): Responsible for equipment selection, equipment placement in the network, interaction with equipment suppliers and other internal groups. Close interaction with equipment suppliers, construction and operations department. Responsible for network design and site design. Detailed knowledge of fiber optic systems including Dense Wave Division Multiplexing (DWDM), optical amplifiers, and SONET. Required education: Bachelor s degree in Electrical Engineering. Required: Experience: 8 years in Engineering field.

Warehouse Acquisition Engineer (WAE1000): Analyze the data structure on content of source systems (transaction applications and network monitoring systems) to build a Data Warehouse interface application. Define business rules for semantic integration of reference data for syntactic correlation of reference (dimensional) data or event (fact) data, including element mapping and transformation step integration, and construction data events. Design, implement and document high scale applications to extract, transform and load the data warehouse and data marts while maintaining data history. Must have Oracle or UNIX SQL, UNIX development and Systems Development Prefer to have Data Warehousing Decision Support, Sun Solaris, Data integration, data design, database design, PL SQL. Required Education: Bachelors of Science degree or related discipline. Required Experience: 5 years in Engineering field.

Senior Engineer (SE8000): Design and development of various computer systems and related technologies. Work with internal architecture and deployment models for high volume web based applications, installation, management and monitoring of server applications such as Netscape Application Server and Microsoft IIS. Configuration management in a Java development environment using PVCS and ClearCase.

Please send resume via email to RBAResumes@Level3.com. Please state the job number when applying.

Ram Tech Systems, Inc., a computer hardware and software consulting firm, seeks interested applicants in the following positions for our Allentown, PA location.

Programmer Analysts. These positions involve designing, analyzing and developing client server applications involving Mainframe, Mid range, Personal Computer systems and RDBMS. A qualified applicant should hold a bachelor's degree in Computer Science or related field and a minimum of two years of relevant programming experience.

Chief Computer Programmer. This position involves supervising software consultants and consulting with managerial and systems personnel to clarify program intent, identify problems and determine extent of work required as well as, planning and directing the processes to accomplish necessary work. A qualified applicant should hold a bachelor's degree in computer science, engineering or related field and possess five years of relevant experience or alternately possess a master's degree in computer science or related field.

Windows Administrator. This position involves administering the design and remote site installations for Windows 2000 developing and running scripts for integration of various third party applications. A qualified applicant should hold a bachelor's degree in Computer Science or related field and a minimum of one year of relevant programming experience.

Send resumes to: Ram Tech Systems, Inc., 809 North 2nd Street, Suite 500, Harrisburg, PA 17102

Programmer Analyst/Multiple Openings! Plans, develops tests and documents computer programs. Converts project specifications using flowcharts and diagrams, into sequence of detailed instructions and logical steps for coding into computer language. Analyzes, reviews and alters program to increase operating efficiency or adapt to new requirements using RDBMS and related software. Work involves extensive travel and requires relocation. Must have 1 year of experience in job offered or as a computer professional as well as 1 year using 1 from Group A and 2 from Group B OR 1 from A and 1 from B and 1 from C OR 1 from A and 2 from C. A) DB2 FoxPro Informix Ingres, MS Access, Oracle, Paradox, Sybase and Unify. B) AIX, DOS, HP-UX, MVS Novell, OS/2, Sun OS, UNIX, VAX/VMS, Windows. C) 4GL, APT, C C++, COBOL, Case Tools, C Shell, Crystal Reports, E-SQL, Easytrieve, JAVA, ODBC, PowerBuilder, PowerDesigner, Power J, Power++, S-Designer, SQL, Shell Script, Visual Basic. Bachelors degree or equivalent in one of several listed fields. Computer Sci, Apps, Eng, Chem, Math, Physics or a scientific or business related field. Salary: $60,000 per yr, 40 hrs/wk, 9:00-5:00 p.m. Please submit resumes to Mr. Terrance Kinney, Manager, Armstrong County Team PA CareerLink, 1270 North Water Street, P.O. Box 758, Kittanning, PA 16201-0758. Job Order No. WEB 1308846

Senior Programmer/Analyst

SpectraFAX Corp, a Naples, FL developer of integrated messaging systems is seeking applicants for the position of Senior Programmer/Analyst. Minimum Qualifications: B.S. in Computer Information Systems or Electronic Engineering and 6 years of demonstratable full-lifecycle, commercial software development. Prior experience in and ability to work on all phases of application development, including complete understanding of component driven development, software analysis, and technical documentation. Strong VC++ experience and understanding of Windows NT/98 and MS Technologies: multi-threading design, NPC, COM/OLE, Web/Internet protocols (IP, SMTP, POP3/IMAP, HTTP, FTP). Working knowledge of MAPI, TAPI, ODBC, OLE DB, SQL, UNIX and Telephony. Must be able to independently perform software designing, coding, testing, debugging, documentation, and installation tasks in accordance with industry best practices and specific, internal procedures/standards to develop new client/server application software modules using VC++/OLE, VC++ ext's, and VC++ and VB COM projects. Salary 55K/year plus benefits. Email resume to jobs@spectrafax.com, or fax 941-643-9782

PROFESSIONAL Implementation Specialist Requires: Bachelor's degree in Computer Engineering or in a related field. Also requires 1 1/2 years experience in the job offered. Exp must include 1 yr installing, tuning and testing ORACLE database. Provide technical programming and integration database skills. Primary responsibility is the configuration of the database by using customer's configuration choices. Responsible for database tuning and performance and coordination of the customer host interface. Consult clients on ways to improve implementation. Design configure, develop, test, analyze, modify maintain and support systems and relational databases for various clients using C, C++, SQL, PL/SQL and Oracle under Windows NT and Unix operating systems. 40 hrs./week, 8 a.m. to 5 p.m. M-F. Salary $53,560.00 per year. Apply in person or send two resumes to: North Metro Job Order # GA 6736553, 2943 N. Druid Hills Road, Atlanta, GA 30329 or the nearest Department of Labor Field Service Office

Applications Programmer Analyst. Perform database design and analysis of relational database and client/server based systems with associated graphical user interface. Design applications in Oracle RDBMS in conjunction with SQL*Plus, SQL*Menu, SQL*Reportwriter, Pro*C and Oracle Forms. Perform coding, implementation, testing with data input and output requirements and maintenance of information systems. Provide program development documentation and technical support and training to users. Must have a Bachelor's degree in Computer Science. Must have at least two years of experience in the job offered. Resume required. 40 hrs. wk. 8:00am - 5:00pm. Overtime required as needed. $67,000/yr. Overtime pay exempt. Applicants must show proof of legal authority to work in the U.S. Send resumes to the ILLINOIS DEPARTMENT OF [illegible] SECURITY, 401 South State Street, 7 North, Chicago, Illinois 60605. Attention: Lydia Clarke. Reference #V-IL 24165. E. AN EMPLOYER PAID AD. NO CALLS. SEND 2 COPIES OF BOTH RESUME & COVER LETTER.

Software Engineer. Duties: Research design and develop computer software programs for clients. Work with users to formulate the best software plan to fit the needs of the industry. Analyze client software requirements, calculate its viability within framework of economic and time constraints. Consult with hardware engineers and others to oversee interface between hardware and software, and operation and performance requirements of the overall system. Develop and direct software systems testing procedures; programming and documentation. Must have Bachelor Degree in Computer Engineering or Engineering. 3 years exp as a Software Developer or Software Engineer and 3 yrs exp in all life cycles which includes gathering the requirements, design, code and test (exp. Can be acquired concurrently).

Salary $32.17/hr M-F 8:00 a.m. to 5:00 p.m. 40 hrs/wk OT as req'd. Send resumes/CV to The Phila. Job Bank, 444 N. 3rd St. - 3rd Floor, Phila., PA 19123. Please include Job Order No. 6084858.

Systems Analyst. Plan, develop & test computer programs & systems for advanced data comm. database management & technical applications using PowerBuilders, Oracle & other advanced software tools. Write documentation to describe program development, logic, coding & corrections. Develop software to deploy & upgrade complex client/server applications. Req. Master's degree (or equiv.) in Comp. Sci. or related field + 3 yrs. work exp. in job offered or 3 yrs. exp. as Programmer Analyst. Applicants must have proof of legal authority to work in the United States. Job/Interview site: Overland Park, Kansas. Salary $80,000/yr., 40 hrs./week, plus overtime (exempt). Please apply with a resume in hand to any local Kansas Job Service Career Center or send resume to: KS Department of Human Resources (PKS2300125) Attention: Jane Burbridge 401 SW Topeka Blvd., Topeka, Kansas 66603-3812

Interactive Designer Atlanta GA Design develop and implement graphic designs for internet, intranet and extranet solutions using Photoshop Illustrator and other graphic programs. Implement multi media platforms for computer illustrations and animation using computer design tools including AutoCad. Develop visual concept logos typograph and icon design for use in virtual marketing networks, intranets, global online brands and other evolving computer innovations. Research and evaluate new internet design tools. Requires Master's degree in Fine Arts, Graphic Design or related field. Coursework must include classes in AutoCad and Typography. EOE. 40 hrs/wk. Salary $63,000/yr. Send resume (no calls) to Diane Tuccito, Answerthink Consulting Group, 817 W. Peachtree St. Ste. 800, Atlanta, GA 30308. Must have legal auth. to work in the U.S.

Senior Systems Analyst. Quality Assurance. VW Credit, Inc. (VCI), a finance company is seeking a Senior Systems Analyst, Quality Assurance for its Libertyville, Illinois facility. The successful candidate will be responsible for quality assurance and quality control of software, for facilitating and managing IT projects, recommending best practices and tools. Qualified candidates will possess a BS degree in Computer Science or related field, have 2 years experience in systems analysis and quality assurance, have experience in automotive receivables software and development of multi-user client-server and web based systems. Interested candidates should send their resume and salary requirements to: VCI, 1401 Franklin Blvd., Libertyville, IL 60048. Attn: Randy Vela. No phone calls please. VCI is an equal opportunity/Affirmative Action Employer.

Systems Analyst. Plan, develop & test computer programs & systems for advanced data comm. database management & technical applications using COBOL, XPediter & other advanced software tools. Write documentation to describe program development, logic, coding & corrections. Develop software to deploy & upgrade complex client/server applications. Req. Master's degree (or equiv.) in Computer Sci. Applicants must have proof of legal authority to work in the United States. Job/Interview site: Overland Park, Kansas. Salary $5,250/mo., 40 hrs./week, plus overtime (exempt). Please apply with a resume in hand to any local Kansas Job Service Career Center or send resume to: KS Department of Human Resources (#KS2300127) Attention: Jane Burbridge, 401 SW Topeka Blvd., Topeka, Kansas 66603-3812

Info-Matrix Corporation, a professional information technology consulting company providing a broad range of services including mainframe and client-server software design and development, requires skilled programmer analysts, software engineers and software consultants with experience in the following areas:

UNISYS 1100/2200, COBOL, DMS 1100, DPS
UNISYS 1100/2300 RDMS
MS Visual Basic, C++,
MS SQL Server
Natural / ADABASE
MS Windows NT Administration

Send resumes (including Ref. #IEE1) to:
Info-Matrix Corporation
2801 North Front Street
Harrisburg, PA 17110
Or e-mail to:
Jobs@info-matrix.com

Senior Software Developer/ Cool 2E

Job Duties

Full life cycle development of business systems with Cool 2E. Function as a technical teammate with the ability to lead small teams. Prepares technical reports, progress reports, memos and instructional manuals as documentation of program development. Mentor to junior teammates.

Minimum Requirements.

BS or equivalent in Computer Sciences or related concentration. One year of prior experience must include most of the following software tools:

1 Cool 2E: RPGIII/III-400 SQL Windows Cool Plex is a plus. 2 Use of IBM Midrange Computers i/AS400 System 38,36/34) and PCs

Please submit resume to

Job 1001
Email to: jobs@mwcorp.com

Computer Systems Analyst (Plattsville) Design, test and document hardware, software and engineering systems utilizing PLM, C and Assembly languages; perform structural testing; verify real-time embedded software products including JAS 39, MD10, Boeing 767, and ATNSI; analyze and interpret test data; develop tests in AQA PLM and C based applications. Required: Bachelor's Degree in Engineering. One yr exp. in job offered or one yr. as Software/System Engineer. Related occupation must include the design, development and implementation of software systems utilizing PLM, C and Assembly languages. $46,000/yr, 40 hrs./wk., 8:00 a.m. - 5:00 p.m. Two copies of resume. Chair Phuoi-Van, DWE-ALC, P.O. Box 7972, Madison, WI 53707-7972. Reference File #C101705.

Software Engineer, Nashua, NH. Design, analyze, develop & implement programs & systems; code program test, repair & modify softw programs to ensure the technical accuracy & efficiency of the programs; interact with end users of systems; carry out applic tuning, backup & recovery & database security maintenance; use advanced Internet programming tools to develop various programs, use C, C++, Oracle, MS SQL, PL/SQL, Java, Java Script, HTML, Windows NT/95, SUN Solaris & TCP/IP. Qualifs: MS in Electronics & Instrumentation/Eng + 1yr exper in job offrd 40 hrs/wk 8am-5pm $75,294/yr. Send two copies of resume/letters of applic to Job Order # 2000-339, P.O. Box 989, Concord, NH 03302-0989.

COMSYS is an established IT consulting firm that serves leading corporations including 174 of the Fortune 500. With COMSYS you get Extensive Benefits, Additional Compensation for referrals, and Professional Challenges with training and assignments to keep you at the forefront of technology. With over 30 offices, we need the services of experienced consultants across the US.

- Package Applications
- Network Specialists
- Web-based Technologies
- Mainframe Legacy Systems and
- Technical Recruiters

(specializing in the above)

Submit resume to:
COMSYS
4000 McEwen Rd S
#110
Dallas TX 75244
www.comsys.com
Fax 972 960 0914
EOE M/F/D/V

COMSYS

Software Engineer Nashua, NH. Analyze, design, develop, implement & maintain various softw programs, applics, and computer systems code program and implement softw programs and computer systems using C, C++, Cobol, Oracle, write & test, repair, modify software programs to ensure the technical accuracy of the programs, provide technical solutions for business systems & financial management systems, create e business model using Designer 2000, create tables & indexes using PL/SQL, use HTML, Oracle Web Server V 3.0, RDBMS, Windows 95/NT, Sun Solaris & Oracle Financials 10.7. Qualifs: MS in Comp Sci/Maths, + 1 yr exper in job offrd 40 hrs/wk, 8am-5pm, $76,294/yr. Send two copies of resume/letters of applic to Job Order # 2000-341, P.O. Box 989, Concord, NH 03302-0989.

Food distributor req. computer analyst w/ 2 yrs exp or 2 yrs exp as a Computer programmer to install, update and maintain computer systems. Send resume & salary req. to HR Dept., Swiss Connection Inc., 501 First St., Orlando/FL 32824.

Software Developer, Sr. level -- For Internet co. resp. for developing state of art on-line financial systems over Internet & commercial on-line systems for company's customers; programming, testing & rollout of Web-based transactional systems, programming & prototyping in web languages incl. Java, C/C++. Req. M.S. in Comp. Sci. or related. In lieu of M.S., a B.S. in Comp. Sci. or related field & 5 yrs. exp. as Software Developer, 6 months exp. developing web applications. Proficient in Obj. Orient. concepts, Unix, Java, C/C++, & Perl. Travel required. 40hrs/wk. Send resumes to Melissa Ryan: resumes@destiny.com

Programmer Analyst (Varying client sites throughout the US) Design, development, implementation and maintenance of customer specific software using C, C++ programming languages and ACCESS database management systems in WINDOWS 95/NT operating system. $65,000/yr. 40 hrs/wk Mon-Fri 8am-5pm. REQD: Bachelor's in Comp. Sci., MIS, Math, Business or Engineering and 2 years exp in job offered. Apply at the Texas Workforce Commission, Dallas, Texas or send resume to 1117 Trinity, Room 424T, Austin, Texas, 78701. JO # TX 0944351. "AD paid by an Equal Opportunity Employer"

COMPUTER ANALYST

Computer analyst to develop advanced web-based application regarding power generation, transmission, and scheduling for company that makes gas, power and electricity. Respond to Jason Murphy, Dynegy Inc., 1000 Louisiana Street #5800, Houston, TX 77002, reference job code CWJM102500. Equal opportunity employer.

Senior Database Administrator. Manage, direct and control the activities related to the support and maintenance of Oxford's databases. Forward resume to: Amy Johnson, Director Human Resources, Oxford Global Resources, Inc., 4 Centennial Drive, Peabody, MA 01961. EOE.

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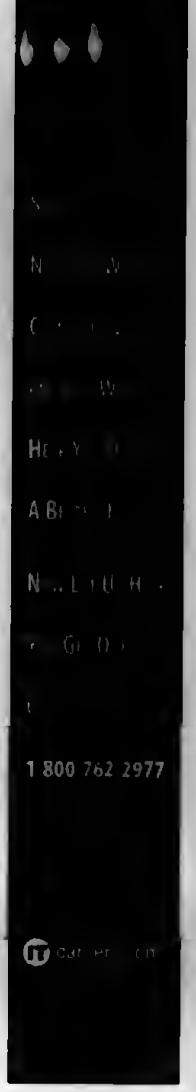

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We are looking for an exceptional leader to oversee the operation, maintenance, usage and enhancement of the Port's PeopleSoft Enterprise Resource Planning (ERP) software, which supports our lines of business goals and plans. Requires 7 years of business and technology project management experience in the area of accounting/financial software; knowledge of design, programming and full development life cycle; BA/BS in a related field and 3 years of personnel and budget management experience. Preferred qualifications include an MBA, experience with PeopleSoft Financials and prior experience leading organizations in effective use of an enterprise software system. See our web site at www.portseattle.org for further details.
Filing closes on Friday November 10, 2000, at 4:00p.m. Please send resumes/applications to: P.O. Box 1209, Seattle WA, 98111 or fax to (206) 728-3004.

Port of Seattle

Senior Software Engineer sought by company in Denver, CO specializing in software solutions to work in Houston, TX & other unanticipated job sites in the US. At a senior level, design, develop, & implement software applications for land management in the oil & gas industry, especially geographical information systems (GIS) software. The software applications incorporate client/server architecture &/or are web-enabled. The applications interface with ORACLE & other relational database management systems. In addition to designing & developing the land management software applications, especially GIS software, engage in post-sales implementation work, including developing interfaces between new & legacy software applications systems & migrating data. Engage in project management as needed. Use Powerbuilder, Pro*C, SQL, Arcview Development tools, the SDE tool set, & the Arcinfo tool set in the design & development process. Requires Bachelor's or foreign equivalent in computer science, engineering, or related field (incl. chemical engineering). 2 yrs. designing & developing GIS software. Working knowledge of the Arcinfo tool set, ORACLE & SQL. 8am-5pm, M-F. $72,000/yr. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order Number CO4660366.

Consultant sought by company in Englewood, CO specializing computer consulting to work in Englewood & other unanticipated job sites in the US. Conceptualize, analyze, design, implement, test, maintain & problem-solve different types of system-level database & object-oriented software systems. Work with a number of operating systems, including Windows 98, Windows NT 4.0 & Unix. Perform analysis of business processes of customers, collect & analyze data, make recommendations pertaining to business processes, & build technology applications that address specific customer issues. Design computer systems to perform processes using various tools & programming languages, including Java, PIM, & Clarify, MS C++, Visual C++, C, SQL, Visual Basic, HTML, & Oracle. Requires Bachelor's or foreign equivalent in computer science or engineering or related field. Working knowledge of Java, Corba, Windows NT 4.0, Unix, C/C++ & HTML (working knowledge may be gained through employment experience or through academic program). 8am-5pm, M-F. $62,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order Number CO4660382.

User Support Analyst (Lafayette CO) - Bachelor's Degree or foreign equivalent in Business Administration or Computer Science. 1yr. exp. in the job offered. Under close supervision, the following work is closely monitored. Assist in investigating and resolving computer software and hardware problems of user. Write software and hardware evaluation and recommendations for management review. Assist with network service projects and problem solving. Monitor, test, troubleshoot and maintenance of data support for hardware/software and telecommunication components. Configuration of workstations with software applications. Set up network users and security rights. Utilize UNIX, Windows operating systems and NT Workstations and Servers. Utilize C language, DOS, BASIC, DELPHI, LOGO and TCP/IP. 40 hr wk. Salary $42,000.00 per year. Application by resume ONLY to Colorado Department of Labor & Employment, ATTN: Jim Shimada, Office of Employment Programs, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, Colorado 80202-2117, and refer to Job Order Number CO4660663. NO PHONE CALLS PLEASE. Must have proof of legal authority to work in the U.S.

AirFlash, Inc. is looking for a Sr Software Engineer for its Redwood City, CA office. Position requires BS or foreign equiv in CS, Eng, or related field & 8 yr exp researching, dsgng & dvlpg comp s/ware. Skill sought: C/C++, JAVA, and RDBMS.

Respond to: HR Dept, AirFlash, Inc., 1733 Woodside Rd, Suite 110, Redwood City, CA 94061. For More job opportunities see [www.AirFlash.com]

Project Director in Santa Clara-Plan direct & coordinate activities of comp profts in multi-tiered C/S, internet/intranet based multi-user applics projects utilizing Oracle FinT, UNIX, PL/SQL, SQL, etc. Min 3 yrs exp. in pos offd or related pos & *MS deg in Bus & Comp Sci or related field. *In lieu of MS, will accept BS + 2 additional yrs exp in job offd or in related position. Exp references reqd. Sal &108K/yr. Send resume to: Integrand Info Sys, Inc, 3408 Howell St, Ste C, Duluth, GA 30096.

Software Engineer (2 positions) – Plans, develops, tests and documents computer programs, applying knowledge of programming techniques and computer systems on IBM AS/400 platform using DB2 and ILERPG/400. Requires a Master or equivalent in Computer Science, Electrical or Electronic Engineering or Mathematics. Equivalent in Bachelors degree plus 5 years experience. Must have 3 years experience if Masters degree or 5 years experience if Bachelors degree as Systems Analyst or Programmer Analyst. Must have one-year experience using DB2 and ILERPG/400 on IBM AS/400 platform. 5 day, 40 hr/wk. $72,540/yr. Please mail resumes to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to order number CO 4660285.

System Analyst wanted by Computer Services Co. in Hayward, CA. Must have BS or foreign equiv in CS or related field & 2 yr exp.

Respond to: HR Dept, Computerland of Hayward COH, Inc., 2252 West Winton Ave, Hayward, CA 94545. For more job opportunities see www.computerlandsfbe.com

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Data Warehouse Specialist wanted by manufacturing company in Elmhurst IL. Must have Bachelors in Computer Science/Industrial Engineering/Electrical Engineering and 2 years experience as systems analyst. Respond to HR Dept., Chamberlain Group, 845 Larch Avenue, Elmhurst, IL 60126

Software Engineer (Calabasas, LA, CA) to design/test/maintain applications utilizing C, SQL, People tools AS/400 UNIX, Visual Basic, Oracle and Sybase evaluate systems effectiveness recommend improvements trouble shoot problems in programming and other project specifications. Require MS or the equivalent in Comp. Sci., Math, E.E. or in a related field plus 1 yr. exp. (or a BS plus 5yr progressive exp.) In offered position or as Programmer/Systems Analyst. Competitive salary. 40hr/wk. Mon-Fri, 8:00am-5:00pm. Resume to: Mr. Jastt, Global Software Solutions Inc., 1135 Rue La Chelle Lane, St. Louis, MO 63141. An Employer paid Ad/EOE

Network Engineer wanted by DePaul University for job located in Chicago, IL. Must have Master's in Computer Scienca/Enginaering

Respond to HR Dept., DePaul University, 25 E. Jackson Blvd., Suite 1616, Chicago, IL 60604

Systems Analyst wanted F/T by Systems Consulting Co in Arlington Hts. IL. Bach degree required & 2 yrs exp in Applications dev using ABAP/4 & SAP Script for creating doc templates design rev & code debugging

Respond by resume to HR Dept. STA Consulting, Inc., 855 E. Golf Rd, Ste 2138, Arlington Hts. IL 60005

SENIOR WEB DEVELOPER. Develop website, create SQL tables and VB apps. Must have MS in Computer Science. Must have knowledge of ASP, SQL Server, Visual Basic, HTML, Javascript, COM and IIS. Send resume with cover letter to: Stockpoint, Inc. 2600 Crosspark Road, Coralville, Iowa, 52241. ATTN: Ron Stublen

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Established in 1992, **The Revere Group** employs over 475 people, of which 80% are consultants. Headquartered in Deerfield, IL, we have other offices in the Boston, Charlotte, Cleveland, Denver and Milwaukee markets. We are looking for innovative and experienced consultants who have distinguished themselves professionally. We are growing our team and are in search of talent in the following areas:

- IT Strategy
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- Knowledge and Media Management, Workflow & Data Warehouse
- Custom Application Development & System Integration
- Database, Network & Infrastructure Architecture
- Change Management & Training
- Application & Infrastructure Outsourcing

For consideration, please submit a resume to:

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1751 Lake Cook Road, Suite 600
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Software Engineer (St. Louis, MO) design develop and maintain mgt. info. systems for engr., installation, customer service and order mgt. Duties include using OLE DB to program for data transfer between main frame, UNIX Informix and SQL server using Shell and Java, to write CGI script, and using Visual C++ and Visual Basic to write Active Server Page with embedded COM component for corporate Intranet web sites. Requires Master's degree in Comp. Sci. or Elect. Engr. $64,500/yr. 40hr/wk, Mon.-Fri., 8:15am-5:15pm. Respondents must be presently authorized for permanent employment in US. Resume to Mrs. J. Gaston, MO Div. of Workforce development, 4040 Seven Hills Dr. Ste. 166, Florissant, MO 63033-6700. Re: Job#244935. An employment paid ad / EOE

Reports Analyst wanted by manufacturing company in Elmhurst, IL. Must have Bachelor's in Computer Science/Electrical Engineering and two years experience as systems analyst.

Respond to: HR Dept. Chamberlain Group, 845 Larch Avenue, Elmhurst, IL 60126.

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Business Systems Analyst, Dayton, OH: Analyze customer's business requ'ts, eval, dvlp & implmt solutions using FlexGen s/ware; document systms, train end-users, provide technical on-line support of FlexGen, incl integration w/impact. write FlexGen technical articles, liaison betw. FlexGen dev team & clients' test & distribute new FlexGen releases. Perform installation support on various OS systms & Cobol envrnmts, support of RM/Cobol, AcuCobol & MicroFocus Cobol syntax. Prep analyses to help establish e-business procedures. Perform Unix admin support. Use s/ware & h/ware such as FlexGen, FronTier, FlexGen U/Sql ODBC, Sco Unix, HP Unix, IBM AIX, WinNT, Win95/98, MS Word, Excel & Access, Internet & email s/ware. Req. Bach Deg (or foreign equiv, or equiv in education) in Business Admin or related field + 2 yrs exp as Business Systems Analyst performing similar duties. Fax resume to (937) 438-5377

Consult with client users and management personnel to determine technical requirements, define problems and implement solutions. Analyze design and develop relational database applications for Oracle using PL/SQL and Pro*C. Provide database modeling and design and code data extracts in Oracle. Multiple Positions Open

Bachelor's degree or equivalent in Comp. Sci. or related field (Comp. Eng., Comp. Appl., MIS, or CIS), Math or Eng., plus two years experience in the job offered or in a related software development occupation. Experience in related occupation must include analysis, design and development of relational database applications using PL/SQL and Pro*C

$65,000 annually, full time, 8:00 a.m. – 5:00 p.m. Work in the Denver area. Application is by resume only. Submit resumes to: Colorado Department of Labor and Employment, Employment Programs, Attn: Jim Shumada, Ref #CO 4679775, Two Park Central Suite 400 1515 Arapahoe Street, Denver, CO 80202-2117

Computer Programmer/Analyst. 50 hours/week from 8AM to 6PM. $60,000/year. Computer programming systems analysis, and other software development work on IBM AS/400 using RPG/400, CL/400, and SQL/400. Requires Bachelor's degree in Computer science and three years experience in job offered. Applicants must show proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attention: Ms. Lydia Clark, Reference # V-IL-23655-E. An Employer Paid Ad. No Calls. Send two copies of both resume and cover letter

Programmer Plan, develop, test, document and maintain computer programs, systems, networks and websites using Erwin, MS SQL Server, Visual Basic, PowerBuilder, Fox Pro, Windows NT, and HTML. Maintain Merchant Account Services System. Day shift, full-time, competitive salary. Bachelor's degree in Comp. or Info. Science req'd, as is one full year of exp. in the job offered or in a programmer analyst position. Employer will accept a masters level degree in lieu of a bachelors degree plus one full year of experience. Resumes to Carmel Financial Corp., Inc., Sharon Van Hoozer, R&W File 2271.01, 101 E. Carmel Dr., Ste. 200, Carmel, IN 46032.

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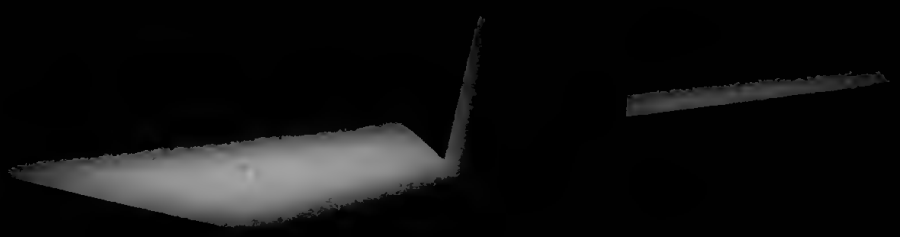
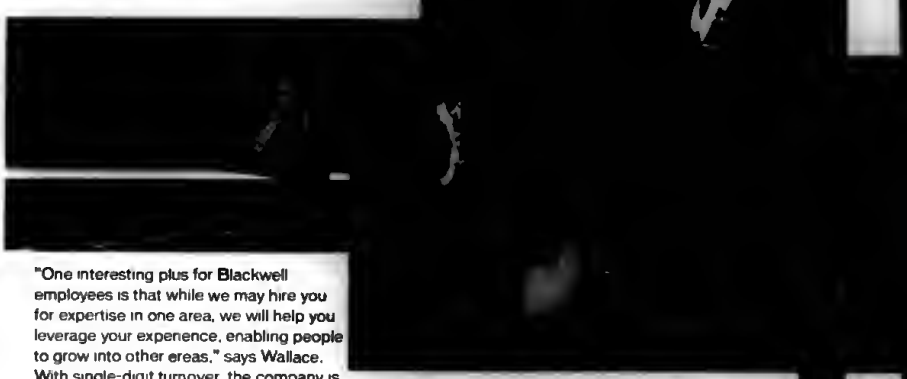


IT Careers in PeopleSoft

Market saturation is a reality in the aggressive IT world. However, what has been common among Fortune 100 companies has not been common in every market sector. The result is that there is continuing need for specialized skills and experiences within the Information Technology industry.

Such is the case for PeopleSoft where there's a need for integration skills and dynamic innovation as PeopleSoft applications adapt to meet entirely new markets.



Blackwell Consulting Services
Chicago, IL

Blackwell Consulting Services provides application and systems expertise in an environment committed to building personal relationships with clients. "We partner with other companies and innovate to bring the best possible solution to our clients," says Beth Wallace, director of package solutions at Blackwell.

The firm provides network design, web development and design, web enabling applications, call center expertise and strategic planning for its clients. Some recent projects include developing a long-term institutional strategy for the U.S. Naval Academy while also supporting the State of North Carolina in developing its strategy for telecommunications and public television. The Blackwell team is currently helping the Chicago Public School System internet-enable 660 schools.

Founded in 1994, Blackwell has been a lead player in PeopleSoft technologies for the past three years. "We're focused right now on bringing this capability to the public sector – government, as well as education," says Wallace. As the company plans to increase its workforce by more than 30 percent in the next four months, Wallace and other Blackwell leaders are looking for people who have a proven record in specific IT disciplines, whether PeopleSoft, ERP, network design, Lotus Notes or IT consulting.

"One interesting plus for Blackwell employees is that while we may hire you for expertise in one area, we will help you leverage your experience, enabling people to grow into other areas," says Wallace. With single-digit turnover, the company is committed to providing leading-edge work for employees while preserving the good elements of a strong employee/company relationship. "Yes we have aggressive bonus structures and compensation," says Wallace, "but what keeps people here is that our founder and CEO, Bob Blackwell, is committed personally to every employee." The commitment is shown through the company's commitment to fast learning, as well as work/life balance that includes flexibility.

A second distinction for Blackwell is its diversity. Wallace says that 22 countries are represented among employees. "As individuals, these employees have a rich combination of skills that reflect their countries and backgrounds – a rich mix of resources that benefits our clients but also the people who work here," she says. "Just as diverse as the people and skills you'll be exposed to here are the projects we work on."

The Revere Group
Deerfield, IL

At the Revere Group, the aftermath of Y2K has meant a new focus on enterprise applications that are value-added and that reduce cost. "This has meant more pressure on us to help clients quantify and qualify improvements to their information technology," says Kim Wochinski, vice president-enterprise application solutions. "We're more innovative in redesigning processes, resulting in more and more exciting ways of applying solutions such as PeopleSoft."

Projects have included complete overhauls of business operations. For one client, this involved everything from delivery of service to cash flow. Another project found Revere Group developing a new resource management tool, based on PeopleSoft, for a professional services firm – identifying gaps and filling needs.

The Revere Group today has 475 employees and is looking to hire nationwide, primarily in Deerfield, Denver, Boston, Milwaukee, Cleveland and Charlotte, NC. "We need people with a strong business background, multiple experiences with ERP systems such as PeopleSoft," says Wochinski. "The best case scenario is a strong combination of functional and technical skills."

The Revere Group likes to have an average eight to 10 years experience on its customer teams. "More than 75 percent of our employees have over 10 years experience," she adds. In addition to providing challenging projects, The Revere Group offers three career paths – functional experts, project management or technical.

"The reasons to work for The Revere Group are best reflected in what we hear from employees," says Wochinski. "They tell us that they feel the company is committed to them as people. It shows in our approach to work/life balance and our commitment to 80 hours of training for each person every year. They enjoy the challenging projects we take on for our clients, and they enjoy working with top people in the industry. That emphasis on the employee is important and rare in the consulting field.

"We're committed, too, to leading-edge technology, as well as business practices. That means you can drive new ideas and will be recognized for what you do."

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For more job opportunities in PeopleSoft, turn to the pages of ITcareers.

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Staffers

times been saddled with developers who have built only the most basic of marketplaces.

"A lot of the e-commerce integrators out there are strong at front-end design. They can put a pretty face on a Web site," said Simon Yates, an analyst at Forrester Research Inc. in Cambridge, Mass. "But they lack the expertise to do a lot of the back-end integration that companies need. Most of these guys don't understand back-end systems and IT needs at all."

Cargill Inc.'s eVentures unit in San Mateo, Calif., has worked with more than 10 software vendors and more than 10 consultancies in building seven digital marketplaces.

To help build its first one, Minneapolis-based Cargill hired a consulting firm that hilled itself as a market leader and touted its reference accounts. But staffers soon learned that the "very expensive" outside team could do little more than "throw up catalogs and portals," said Monica Morse, managing director of eVentures.

"As we got into it, we realized it needed to go way beyond that, and this company couldn't take us there," Morse said. "We basically had to throw out [the outside team] and bring in someone who could do the development work in order to make this valuable to the participants."

Now when it hires outside consultants, Cargill asks for résumés, and it interviews every member of the implementation team to make sure it's getting experienced developers who have actually built the marketplaces on the company's reference list. Morse said that in the early days, her company found that consulting firms might be "using people fresh off the street in some cases."

"Every client probably wants the dream team, so it's unrealistic to expect you'll get it. But you sure ask for it," Morse said. "You're always going to find some junior guys in there. You just don't want them learning on your project."

"When I have a project, I have to look not just around the room or around the city, but around the planet," said Dan Bentzinger, CIO at Transportation.com LLC, an electronic-marketplace spin-off of Overland Park, Kan.-based Yellow Freight Co.

Bentzinger said he has outsourced several electronic-marketplace projects to Infosys Technologies Ltd. in India.

Paul Janicki, executive finance director of electronic business at Dow Chemical Co. in Midland, Mich., said Dow sometimes has had to apply pressure to get a more experienced implementation team to build its electronic marketplaces. More than once, Dow has gone back to vendors and consultants to say it's unhappy with the service it's getting.

In fairness to consultancies, Morse said Cargill wasn't always helpful with its earliest marketplaces. Cargill staffers chose the technology vendor before selecting a consulting team and figuring out what they wanted the marketplace to do. Now, staffers first decide what they want the marketplace to do and then find a development partner "who helps you figure out what the right technologies are," Morse said.

"That may sound obvious," Morse said, but it took two projects before staffers realized that they had the wrong process in place.

Continued from page 1

Technology

neapolis-based Cargill Inc.'s eVentures unit, which has invested in and incubated seven digital marketplaces, including Rooster.com in the agricultural market and Novopoint in the food ingredients industry.

Many of the software products for building marketplaces are akin to "Lego sets that you can build a lot of different things with," Morse said. "You're coding, and then you become a software house."

The upshot is that for now, the service offerings at many electronic marketplaces are pretty much limited to auctions and electronic-catalog listings that match buyers and sellers of commodity items. In contrast, collaborative services, such as enabling multiple trading partners to share demand forecasts and product development information or process payments as part of the marketplace transaction, remain largely in the pilot and even visionary stages.

"We're in the e-beta phase, where everything is still in this test mode," said Carl Lenz, an analyst at Gartner Group Inc. in Stamford, Conn.

"The [marketplace software] vendors are spread extremely thin," Lenz added. As a result, "we're going to see limited functionality [in electronic marketplaces] up until about 2005."

But technology isn't the only reason. In some cases, an exchange's targeted users simply aren't ready to make the big leap to conducting part or all of their business digitally.

The $180 billion retail convenience store industry is a prime example, said Nancy Reyda, president of Concord, Calif.-based RetailersMarketExchange, which was launched to serve the more than 270,000 convenience and small-business retailers in the U.S. So far, only 3,000 stores are doing business on the exchange, and all are affiliates of founding member Chevron Corp. in San Francisco.

In the construction industry, in contrast, firms are willing to collaborate and share information such as architectural drawings and schedules. But they aren't ready to buy and sell products online, said Jason Pratt, director of marketplace product management at San Francisco-based Buzzsaw.com Inc., an online exchange that serves the commercial construction industry.

As a result, "we've made a shift to customize our [Ariba Inc.] software platform for a slightly different purpose. We've taken their platform and modified it pretty heavily for a request-for-quote service that we'll launch late this year or early next year," Pratt said.

Lessons learned by other early market makers revolve around the intricacies of customizing marketplace software to suit a particular industry's business processes.

"Oracle [marketplace software] was built to run across multiple industries but didn't meet the needs of retail," said Joseph Laughlin, CEO of GlobalNetXchange, an online marketplace whose founding partners include Hoffman Estates, Ill.-based Sears, Roebuck and Co. and Paris-based retailer Carrefour SA. "We've been customizing applications and putting out new versions every month" since the exchange launched in February, he said.

Still, the exchange doesn't offer end-to-end electronic transactions. "Today, the predominant thing going on is auctions. Payments are occurring off the exchange, and we want to bring them on the exchange," Laughlin said.

Also, by the end of the year, GlobalNetXchange will launch a pilot test of collaborative forecasting and replenishment capabilities, he said.

"Nothing off the shelf works perfectly," noted Tim Clark, an analyst at Jupiter Research Inc. in New York. "I think a lot of people are doing a Version 1 of a marketplace out of the box, then customizing in Version 2 to make it more appropriate for their industry."

Microsoft Launches Car .Net Dashboard Operating System

BY LEE COPELAND
DETROIT

The undisputed king of desktop applications wants a second shot at the title for dashboard applications.

At the Convergence 2000 automotive show here last week, Microsoft Corp. launched Car .Net, a retooled version of its Windows CE operating system for automobiles. Analysts said Car .Net builds upon Microsoft's failed — but long-term — investments in developing a device platform for cars.

Microsoft introduced the Auto PC, a speech-recognition device, nearly three years ago. But the dashboard device never gained popularity with motorists due to a "horrid" implementation, said Rob Enderle, an analyst at Giga Information Group Inc. in Cambridge, Mass.

Microsoft has deals in place with Clarion Co. in Tokyo, Bosch Corp. in Germany and Denso Corp. in Japan to build and ship telematic (in-vehicle communication) devices.

The devices will deliver news, navigation and traffic updates to the dashboard. They won't be available to consumers from automotive suppliers until next year, officials said.

Car .Net is the rebranded version of Windows CE Version 3.0. Microsoft said the upgraded operating system includes better support for XML, wireless access and a critical-process monitor to protect the system from viruses. But additional changes, to link Car .Net to the broader Microsoft .Net platform, won't be available until Version 4.0.

That forthcoming version will include support for C# and Common Language Runtime. With these changes, developers will be able to write Car .Net applications with Visual Studio .Net tools, said Bruce Johnson, telematics group manager at Microsoft.

"It's easier to have one tool kit do all your development from, and in the long term, it could be faster, if it's done right," said Ian Colomby, software engineer at The Bulldog Group, a development firm in Toronto.

Microsoft will face competition from rival Sun Microsystems Inc., which also entered the telematics ring last week. Sun Chairman and CEO Scott McNealy delivered the opening keynote at Convergence 2000, urging suppliers to make heavy investments in telematics and transform vehicles into a "Java browser with tires."

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FRANK HAYES/FRANKLY SPEAKING

Reality check, please

REMEMBER THE PAPERLESS OFFICE? It turned out to be about as practical as the paperless rest room, but it was *the* hot prediction circa 1985. First sketched out three decades ago by University of Illinois professor F. Wilfred Lancaster, the idea was that computers would eliminate paper documents completely. That *sounded* good to lots of deep thinkers — but they were wrong. Sure, computers got rid of some paper. But now they generate more than ever.

At last week's Symposium/ITxpo conference in Orlando, three Gartner Group analysts rolled out their own paperless predictions. One claimed that by 2003, 70% of all business relationships will be within open e-marketplaces, wiping out traditional order/invoice systems. He also said that today's cherished IT skills will be "meaningless" — his word — in 10 years, and that soon most IT people will belong to guilds and will peddle their work as free agents.

Another analyst predicted that by 2005, interagency competition will wipe out one-third of the U.S. government, and the Web will make it possible for voters to enact laws directly.

A third said that by 2005, some companies will report earnings-per-share on a daily basis, and all corporate problems will be "identified and solved in real time," thanks to a new "chief monitoring officer" with real-time access to all corporate data.

Are they right? Are they nuts? We get these visions of the future thrown at us all the time — from analysts, pundits, vendors, consultants and jet-lagged CEOs. They all *sound* good — but how do we know who's right and who's a few sheets short of a ream?

Reality-checking predictions is easier than it looks.

Reality-checking predictions is easier than it looks. Start with a few unavoidable requirements for any change: There's got to be a big enough market for it, small enough resistance and someone actively pushing to make it happen. The "small enough resistance" piece is crucial — enough foot dragging and active opposition will kill almost any change.

Now let's test those Gartner predictions. Will most corporate IT people *you* know dump their jobs by 2005 to join guilds and work as freelancers? Will hordes of well-connected government bureaucrats sit idly by while their power and jobs are eliminated? Will companies want to expose income information on a daily basis, making it easy for competitors to figure out what deals fell through?

Not sounding so likely, eh?

Another easy sanity test: Usually change can't require throwing human nature and historical reality out the window.

Will all corporate problems be solved in real time by a chief monitoring officer? Get real — people hide information now, and they won't stop when Big Brother becomes an official corporate title.

Will we really dump all our business partners in favor of open e-marketplaces by 2003? Yeah, right — only if CEOs quit playing golf together and hiring each other's kids straight out of business school.

Will today's IT skills be meaningless by 2010? Only if mainframes, PCs, the Internet and everything we use today dries up and blows away in 10 years. And doesn't that assumption sound a lot like how we ended up with the Y2k problem?

One more reality filter: Check whether the predicted change isn't really a change at all. Will the Internet enable voters to bypass legislatures and enact laws directly by 2005? It's a little late for that: Voters in most Western states have been able for decades to pass laws through ballot-box initiatives. By 2005 it may be happening via the Internet — but it won't be anything new.

And by then, we'll surely have a whole new stack of paperless predictions. ◗

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SHARK TANK

TOO MUCH SUCCESS University system administration asks IT people at one of its major schools to create an IT training program for high school teachers. The idea is that teachers will take the courses, then go back and teach the kids. But after a few semesters, "the state asked us to stop," says a university IT pilot fish. "It made the teachers marketable commodities – and they all left for better-paying jobs in IT."

TOO MUCH DATA After a laboratory is rearranged, the network connection is in the corner farthest from the workstation. This user pilot fish needs to get it hooked up fast, so he asks for a 40-ft. cable to run through the ceiling right now, figuring a contractor can come in later to do it right. Networking tech objects: "The data won't make it through the cable to the jack." Replies the wise-guy fish, "Don't worry, I'll have the new employee squeeze the cable like a toothpaste tube to help the data along."

TOO MUCH INFORMATION Info-security pilot fish is at a Big Five consulting firm, waiting for a job interview, when he spots a poster on the wall. It's the company's global network topology – servers, routers, IP addresses, everything a bad guy would need to find weaknesses in the network, right where every rejected job applicant can study it. Fish asks the human resources manager about the poster. "Oh, network ops put it there – as a visual aid."

TOO MUCH OF A GOOD THING Company's new TCO group makes Pentium PCs with 17-in. monitors the new standard. Great – except for this user pilot fish whose manager anted up a while back for a pricey 21-in. screen for him. The TCO team says it's got to be scrapped and replaced with a 17-incher. Why dump an expensive monitor? the fish's manager asks. Comes the serious reply: "Because the 17-in. monitor is standard, and we're implementing standard configurations to save money."

Score a Shark T-shirt: **sharky@computerworld.com.** You get a piece of apparel if your true tale of IT madness makes it into print – or shows up on the Web at *computerworld.com/sharky.*

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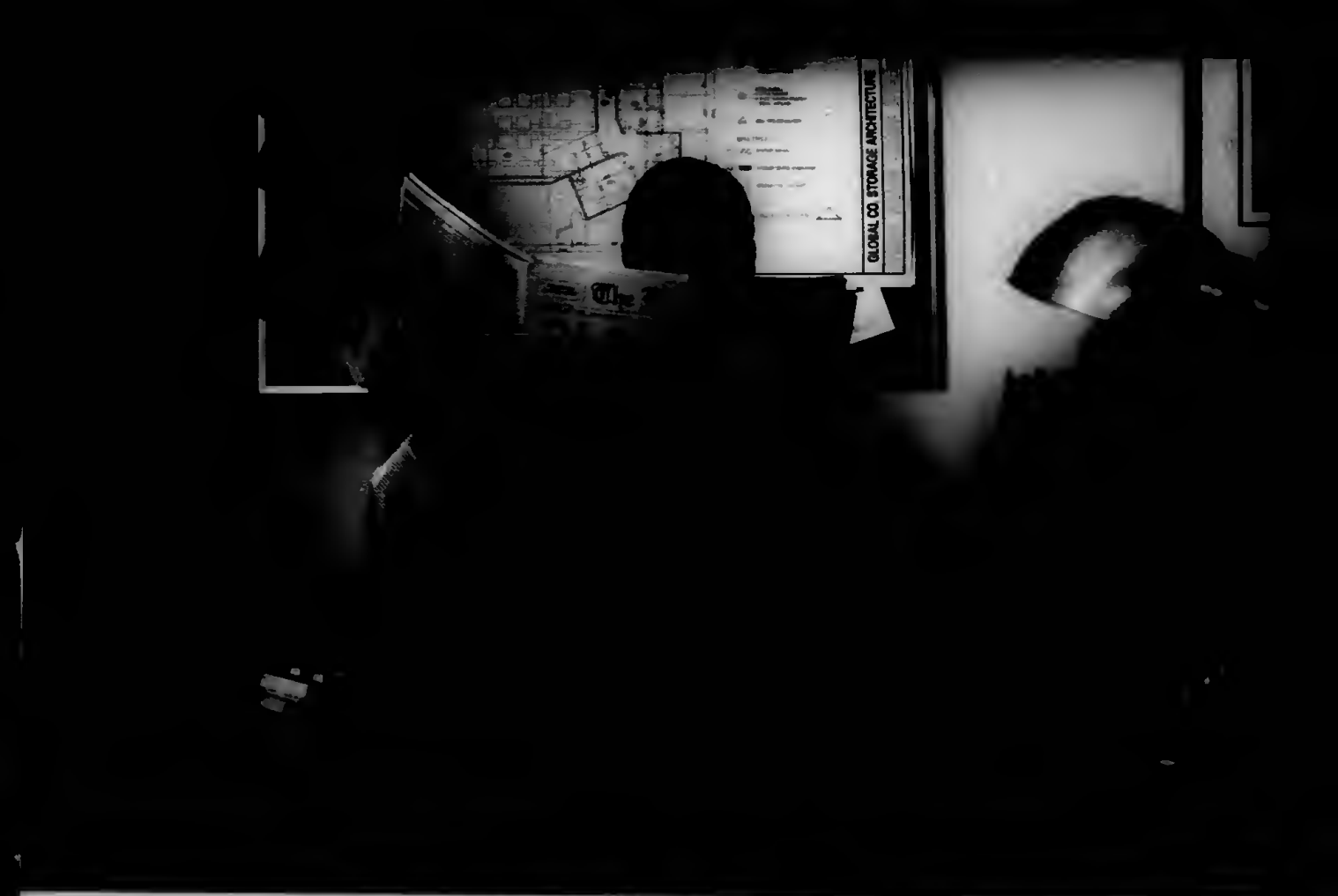

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